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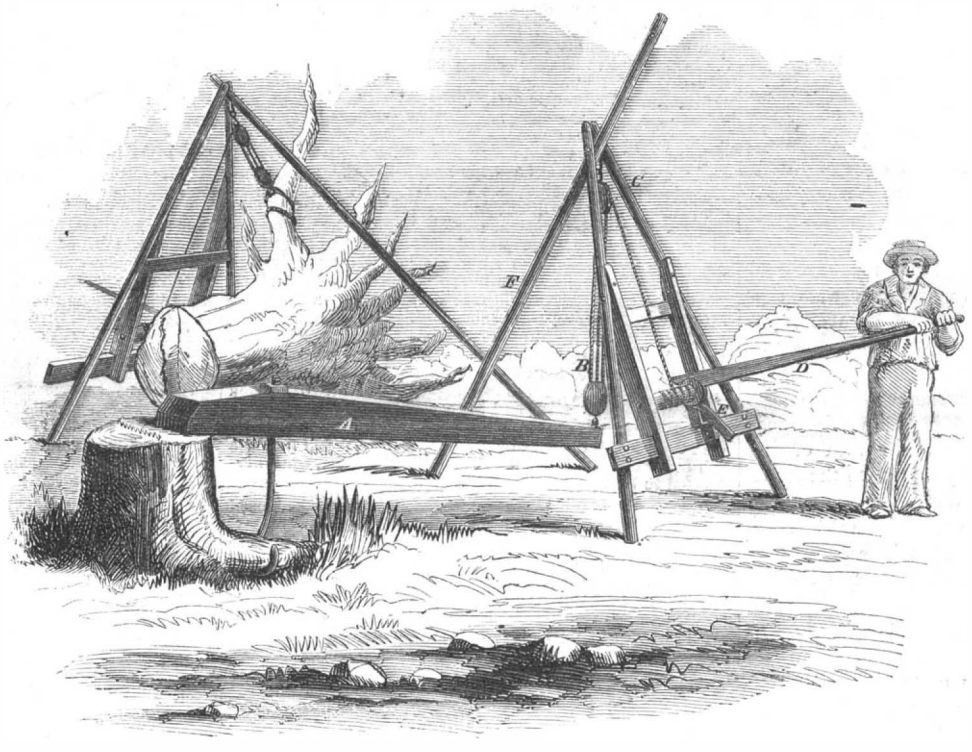
Improved Stump-puller.

The great labor of sweeping the forest from the broad surface of this country, which has been going on for 250 years, is by no means completed; but every year new fields are being rescued from the "interminable shade," and brought under subjection to the plow. Cutting down the trees is not a very formidable task, but pulling up the stumps, *hic labor hoc opus est.*

We have described several machines constructed for the purpose of pulling stumps, and we here illustrate the latest of these inventions, which is claimed to possess advantages over all its predecessors. It is operated by manual labor, the power being so multiplied that when the machine is fastened to the largest oak or pine, the strength of a single man is sufficient to tear up its roots from their deep hold upon the earth.

The machine is formed of a massive beam or lever, A, Fig. 1, one end of which rests upon the stump, a stout chain being passed around the lever near this end and around one of the large roots, while the opposite end of the lever is drawn upward by a pulley, B. This pulley is suspended from the apex of a pair of shears, C, and is operated by a windlass which is turned by the lever, D, a pawl, E, holding the shaft from turning back. It will be seen that, as the end of the lever is raised, the stump is turned over, tearing out the roots upon one side, and either breaking those upon the other, or so loosening them, that the stump may be easily raised from its bed.



BROUGHTON'S STUMP PULLER.

The lever, A, is now laid aside, and the shears are moved directly over the stump, as shown in Fig. 2. The pulley being secured directly to one of the roots, by means of the powerful purchase furnished by the windlass and lever, D, the stump is raised up into the air ready to be loaded into a wagon, or otherwise disposed of as may be desired.

In order to make room for the stump between the two leaves of the shears, one of them, the stick, F, is made longer than usual, and provided with a second hole for the connecting pin, so that in the second position the shears may be widely spread, as shown in Fig. 2.

The apparatus may be easily moved about the field, from one stump to another, by three or four men; and for transportation any considerable distance, the broad portion of the shears may be laid upon the axletree of a pair of wheels, and a horse harnessed between the timbers near the angle. Or the two side timbers may be supported on shoes, and the shears drawn along by a horse attached to the end.

For tearing up trees by the roots, a notch is cut in the side of the tree to admit the end of the lever, A, when one of the roots is chained to the lever, and the work proceeds as in pulling stumps; the weight of the tree top aiding in turning out the roots, and the end of the lever falling out of its notch as the tree goes over.

The peculiar merit of this stump-puller is the mode in which it operates, turning the stump over, and thus overcoming the resistance in the best possible manner.

This machine was invented by Albert Broughton, of Malone, in this State, and secured by Letters Patent dated June 19, 1860. The machines weigh about 400 pounds apiece, and they are sold for $75, delivered on board the cars at Malone. For the purchase of town and county rights, or for further information in relation to the matter, inquiries may be addressed to Broughton & Lindsay, at Malone, N. Y.

A Destructive Invention.

A Mobile paper not long since, in discussing the proposed assault of Fort Pickens (the occupation of which by the Federal troops is a continual eye-sore to the secessionists), suggested the use of some noxious substance to be thrown into the fort, and thus suffocate the troops. It thought red pepper might be made very serviceable for this purpose. The suggestion of the Mobile paper, it seems, is about to be made available.

The Boston *Traveler* states that Gen. Stone, Master of Ordnance, in connection with a committee of the Boston Common Council, has recently been engaged in witnessing some experiments with a noxious and destructive substance, to be used in bombarding towns and cities, or by ships of war. The trials were made upon the Public Garden.

M. Peionier, a Frenchman, claims the invention, which consists of a round ball of different materials, of the most odorous character, and inflammable to such a degree that when once ignited water will not quench the flames. The mass is inclosed in stiff paper, and can be discharged from a mortar or howitzer.

Whatever the ball strikes causes a concussion which explodes the novelly-constructed shell, sets the articles within on fire, which dart out in tongues of flame in all directions, and, at the same time, begins a stench perfectly unendurable for a considerable distance from the burning compound. One striking feature of the invention, as we have before remarked, is that the materials must burn up if once on fire, as water has no effect to extinguish the combustion.

These highly-scented fire balls will be principally effective for service upon the sea. When thrown into a vessel, it would inevitably be wrapped in flames, while the air would be so contaminated that breathing would be very difficult to the crew. They might reasonably be pardoned for endeavoring to escape into a purer atmosphere by running below or by abandoning the ship.

Wool and Flax Fabrics.

It has been found that flax and hemp reduced to fine, short fiber by Lyman's simple explosive system, is well adapted for mixing with wool in various cloths. We have no doubt but cloth made from the mixture of wool with a certain quantity of flax will be more durable than if made entirely of wool. The druggets and old linsey-woolseys, which, in former times, were more common, were very durable fabrics. Strong druggets, made of half wool and half flax, were lasting beyond any of the fabrics common among us at present. Short flax fiber is capable of being most intimately intermixed with the wool in the fulling operation. The shortness of its fiber may unfit it for spinning on cotton machinery and for weaving into plain cloth, but not for mixing with wool.

As there will be a deficient supply of cotton this year, there is a necessity of seeking a new material or the production of other fabrics, to take the place of clothing composed wholly or mostly of cotton. By increasing the number of sheep, the clip of wool may be vastly augmented; and by using fine flax fiber to mix with wool, we may obtain a great increase in the raw materials for making cloth, and thus, in a great degree, modify the evils that may otherwise arise from a defective cotton supply.

THE Charleston *Courier* tells its country readers to save their goose quills, as the stock of steel pens will soon give out.

THE vessels captured by the secessionists, in port and by privateers, since the war commenced, is set down at 41 in number, two of which have been released, and one burned. Thirty of these vessels were seized in port.

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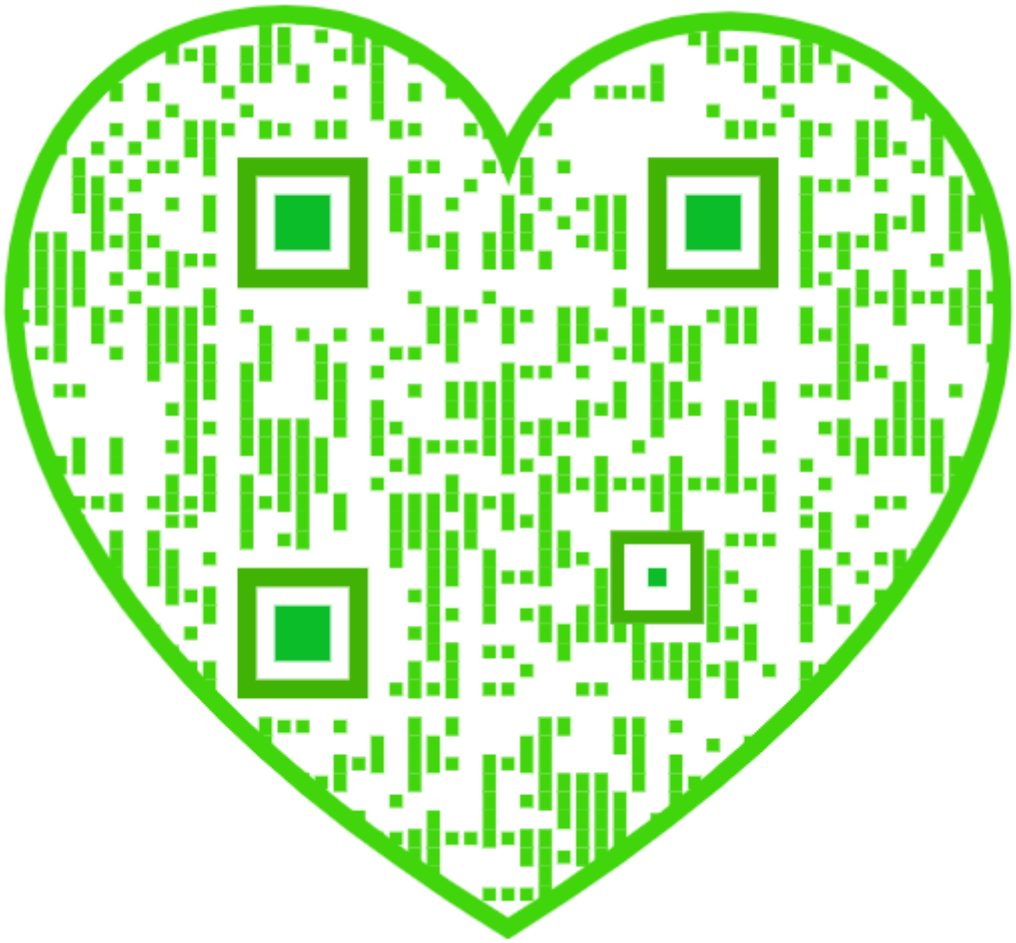

THE WAR.

OPERATIONS IN MISSOURI.

The vigor which has characterized the movements of General Lyon and his command in Missouri, continues to be manifested in the most brilliant manner. In the pursuit of Gov. Jackson, toward the southwest part of the State, Col. Siegel, with his regiment, was some four days march in advance of General Lyon with the main body of the Union forces.

BATTLE OF CARTHAGE.

Near Carthage Col. Siegel overtook a body of some 4,000 secessionists, and notwithstanding the great disparity in numbers, the brave German did not hesitate for an instant to attack the enemy. He approached within 800 yards and opened fire with his artillery. The enemy replied with their cannon, but as they had only round shot, and their artillerists were inexperienced, their fire was inefficient, while that of Col. Siegel did great execution, soon silencing all of the enemy's guns. As Col. Siegel drove back the enemy's center, he was in danger of being enveloped by the wings, when he saw that, in order to save his baggage, it was necessary to fall back. —He conducted this operation in perfect order and with the most admirable military skill. At one point, where the road passed between high bluffs, a large body of mounted riflemen took their position in the woods on each side to oppose his passage; but the Col., making a feint as if to turn the bluff, drew the riflemen into the road, and by a rapid movement of his artillery, poured in such a fire of grape among them that they scattered in every direction.

A detachment of about one hundred, which he had sent away from his main body, were surrounded and taken prisoners, but he succeeded in bringing off the force under his immediate command, and falling back to form a junction with reinforcements. The prisoners taken were released on taking the oath not to fight against the secessionists.

Our loss was eight killed and forty-five wounded. The loss of the secessionists is stated to have been very large. Eighty-five riderless horses were captured, and sixty-five shot guns and a number of revolvers and bowie-knives were picked up on the ground.

SKIRMISH AT MONROE.

In the northeastern part of Missouri the secessionists continue, as everywhere else, their work of destruction to the extent of their power. On the morning of July 10th, about nine o'clock, a company of rebel cavalry, numbering one hundred, made a demonstration at Monroe station, thirty miles west of Hannibal, on the Mississippi. They burned the station house, six coaches and eighteen freight cars, and tore up the railroad track on each side of the town. One Union man was killed.

About two o'clock the camp of the Union troops, under Colonel Smith, of the Sixteenth Illinois Regiment, embracing three hundred of the Third Iowa Regiment, two hundred of the Sixteenth Illinois and about one hundred of the Hannibal Home Guards, were attacked by sixteen hundred rebels under Brigadier General Harris. Although the Unionists were surprised, they repelled the attack and drove the rebels back, killing four, wounding several and capturing five prisoners and seven horses. General Harris retreated to Monroe where another skirmish occurred, in which the rebels were again repulsed. Colonel Smith then took up a position, and sent a messenger for reinforcements from Quincy. Colonel Smith was afterwards surrounded by a large force, but he took a position in the Seminary building and awaited the reinforcements, which were promptly forwarded and the besieging force dispersed.

TWO PRIVATEERS BUSY.—THE JEFFERSON DAVIS.

On Friday, the 12th of July, the brig *Mary E. Thomson*, of Searsport, Me., put into Newport, R.I., having been boarded off Nantucket shoals by a privateer, *Jeff. Davis*, which had previously captured several merchantmen. The brig had on board the mate of the first vessel taken by the privateer, who gives the following account of her operations :—

Capture of the Brig John Welsh.—The *John Welsh*, Captain Fifield, left Trinidad, Cuba, on the 22d of June, for Falmouth, England, having on board a cargo of 300 hogsheads and 475 boxes of sugar. She is owned in Philadelphia, principally by John Welsh, Esq., after whom she is named, and was chartered in Trinidad by a Spanish firm, the owners of the sugar. The voyage until Saturday, July 6, was made without the occurrence of any noteworthy incident, when, about six o'clock in the morning of that day, and while the vessel was off Hatteras, and a little to the eastward of the Gulf Stream, a brig was discovered ahead, showing French colors. The *Welsh*, supposing this signal to exhibit a wish on the part of the stranger to speak her, the American flag was run up in response, seeing which the brig altered her course to leeward, crossed the bows of the *Welsh*, and when near the latter fired a shot diagonally across her bows, the ball passing only about twenty yards ahead, and striking the water about 200 yards to leeward. During this time she continued under French colors, and when the shot was fired it was supposed on board the *Welsh* that she was a French man-of-war. Captain Fifield, at this signal of hostility, gave orders to have the foretop-sail backed, and his craft then hove to. This done, the privateer lowered away her boat with an officer and sixteen men on board. The French colors at the same time were hauled down and the rebel flag hoisted.

The officer was not in uniform, had no sword, and was armed with a revolver only. He subsequently proved to be First Lieutenant Pastille, of the privateer. Like their leader, the men also were without uniforms, and carried no muskets, side arms, cutlasses or weapons of any kind save a few old bowie knives. When the boat—a small surf boat—had reached the side of the brig, the officer came aboard with his men. The side ladder had not been lowered for them; so they were compelled to clamber up the main chains in the best way they could. The lieutenant, gaining the deck, passed aft to Captain Fifield, who had been watching all the proceedings with the greatest anxiety, and whose indignation was uncontrollable at his inability to make any resistance. He had not a carronade or musket, or firearm of any kind on board, except a couple of revolvers, and a sudden becalming of the wind precluded even the hope of escaping by setting sail. The interview between the rebel officer and Captain Fifield was a brief one. The former politely but firmly requested the surrender to the Confederate States of the vessel as a prize, and ordered Captain Fifield to get ready to go on board the privateer as a prisoner. The captain, in response, said he was sorry to be compelled to surrender his ship to an American, and would not have thought so hard of it had it been to a foreign vessel. This ended the parley, and the lieutenant proceeded to the captain's cabin, where he overhauled the ship's papers, while the crew scattered over the vessel and ransacked every portion of her, pillaging and stealing whatever suited each one's particular fancy in the articles they came across. The property carried off comprised the captain's and mate's nautical instruments, charts and books, and the clothing and private effects of the officers and crew. The ship's papers were sent on board the privateer, together with the brig's crew of four seamen, in the first boat, which returned again, and in successive trips took away the stores and provisions, leaving sufficient only for the subsistence of the prize crew subsequently sent aboard. The privateer also exchanged her rotten, worthless small boats for the comparatively excellent ones of the brig. When this transfer had been effected, the *Welsh's* officers—four in number —were sent in one boat on board the privateer—the lieutenant, with some six or eight men, remaining on the prize until the prisoners were disposed of. Shortly afterwards the prize-master, a Charleston harbor pilot, and eight men, were detailed to take charge of her, and the lieutenant having returned to his vessel, the *John Welsh* filled away to the southwest, and was lost sight of about two o'clock in the afternoon. Care had been taken while she was in the hands of the rebel crew not to disturb her cargo. If she reaches any Southern port in safety, she will prove a rich prize to the rebels, as her value, ship and cargo, is estimated to be worth $75,000.

Description of the Privateer.—The mate of the captured brig being thus transferred as a prisoner to the privateer, was able to observe her at his leisure, and was of course present at her subsequent operations. On going on board he immediately recognized her as the slaver *Echo*, which was captured some two years ago and condemned in Charleston harbor. He had frequently been on board of her and knew her perfectly, though her name had been painted out and pains taken to conceal her identity. She is a full rigged brig, painted black outside, and has a very dirty, rusty appearance, which does not at all improve inside. She is heavy looking, sits deeply in the water, and is not at all a rapid sailer. On board everything is in confusion, the decks are unwashed and the spars unscraped. The ropes are tangled and uncoiled, and seldom in their proper places, while the crew appear to observe very little discipline, if any, each one going whither and doing what he pleases. Her sails are all of hemp, except the main topsail and fore topgallant-sail, which are of cotton. A tarpaulin hangs on the starboard side of the quarter aft, and the studding-sail booms hang over the quarter aft. An iron rail runs around the quarter and the poop is even with her rail.

On the main deck, between the foremast and mainmast, the privateer carries a long thirty-two pound gun, one of the old-fashioned English make, with a British crown and other English insignia stamped on the breech. The date of its manufacture and the figures of its caliber cannot be deciphered owing to the thick coat of rust and paint which have successively accumulated on the surface. The gun is mounted on a revolving carronade slide, rendering it capable of being aimed in any direction, like a swivel. It was a shot from this gun that brought the *Welsh* and the other vessels to. Her battery or broadside is located amidships, and consists of four guns. They are two thirty-two pound and two twelve pound carronades, mounted on the ordinary carronade slides. One twelve pounder and one thirty-two pounder are on each side of the ship, giving her a broadside of forty-four pounds. The effect of a couple of these broadside would prove as dangerous, if not more so, to the privateer herself than to her enemy. These guns are of the same pattern as the long gun forward, and are similarly marked and stamped. The port-holes have been pierced in the bulwarks of the main deck, which is made to serve as a gun deck, and are kept closed until the intended victim is within deadly range. In the immediate vicinity of the guns are piled up large quantities of round shot and grape—the latter tied up in little canvas bags. Her crew number about sixty men, and to accommodate the extra force of privateersmen a rough temporary deck has been erected below the main deck and partitioned off into bunks.

Her Officers.—The captain of the privateer is a large, stout man, about 40 years of age, and apparently a Holland Dutchman. He is about 5 feet 7 inches in hight, and wears a moustache and goatee. His name did not transprire, and it was evidently intended to keep it a secret from the prisoners. He spoke English very fluently, but he was reserved, even to tacturnity, and most of the time kept his cabin. His orders he issued in a very mild and calm tone. He wore no uniform or sword, but was attired in plain citizen's dress.

The first lieutenant, the next in command of the vessel, assumes a more prominent part in the *role* of privateersman than his superior officer. His name is Pastille, and he was formerly a midshipman in the United States navy, which service he left to join the navy of Texas when that State was an independent republic. He served with considerable distinction, and, it is said, attained to the rank of commodore. Subsequently, he is stated to have been engaged in the fitting out or commanding of several slaving expeditions from Charleston and Savannah. More recently he held a position in the Custom House of the latter port, where his brother (now dead) was Deputy Collector for upward of 20 years. His connection with the privateer is the next public notice which we have of him. In conversation with the officers of the prize, he stated that he was a native of South Carolina. Pastille is about 45 years of age, very tall and slimly built. He wears no uniform, and carries no sword. He has a moustache and slight whiskers, and bears all the characteristics of an adventurer, with a dash of the hero. Notwithstanding his years, he is very lithe and active, and, in his connection with the vessel, is a busier and more important personage than the captain. He always claims to, and does, lead the boarding of the captured vessels.

Her Crew.—Her crew embraces all nationalities—American, Irish, English, Scotch, Dutch, German, French, Spanish and Italians are all duly represented. Only three or four are Americans. The majority are natives of the British isles. The Italians are two in number. As previously stated, they number about 60 men—ununiformed, and, in a great measure, unarmed. No two of the men are dressed alike. Many have on loose "jumpers" or shirts, made out of blue denim, similar in texture, quality and color to the overalls worn by laborers; others wear coarse shirts made of yellow flannel, such as may be seen in the South, while others had nothing on the upper part of their bodies but their undershirts. Their nether garments—the extremities of which are in many cases pushed into the boots—are of every imaginable color and quality, rivaling in diversity of hues the variegated tints of Joseph's coat. The majority wear ordinary cloth or glazed caps, but some have on black felt hats, with high sugarloaf crowns, resembling the Spanish sombreros, or the hats of Italian brigands. The men appear to have been shipped without the least regard to seamanship, are generally of small stature, and had been tailors, shoemakers, idlers, loafers and the like on shore. They were shipped principally in Charleston and Savannah. Only some 20 are armed with old muskets, and about 20 are provided with cutlasses, extemporized out of the long knives used for cutting canes on Southern sugar plantations. The crew generally are a cut-throat set, and would make an army such as Falstaff would have been proud to lead. Some of them, in their boasting moods, threatened to run the privateer into the harbors of New York, Boston, Philadelphia, and other cities of the North, for the purpose of cutting out vessels at their docks.

Subsequent Captures.—After sending off the *John Welsh*, the privateer set sail toward the northeast, and on the next day, the 7th of July, she took the schooner *S. J. Waring*, of New York, worth, with her cargo, about $100,000. On the 8th, she captured the schooner *Enchantress*, valued at $50,000. On the 9th, she fell in with the ship *Mary Goodell*, of Philadelphia, but as this ship drew too much water to enter the North Carolina harbors, she was released, nine of the prisoners taken from the other vessels being put on board of her. While the privateer was engaged with the *Mary Goodell*, the brig *Mary E. Thomson* hove in sight, and was soon boarded by the mate of the privateer. As her cargo of lumber, however, was not considered of much value, she was allowed to go on her own way, when the captain immediately made sail for Newport, and gave the above intelligence, which has sent a thrill through the whole mercantile community.

Several revenue cutters, a gunboat and a frigate have been sent out from New York and Boston in search of the piratical craft, and as the prevalent winds have been from the southwest since she was heard from, strong hopes are entertained of her speedy capture.

OPERATIONS OF THE "SUMTER."

On the same day on which the *Jeff. Davis* made her first prize, the 6th of July, the steamer *Sumter* arrived in the harbor of Cienfuegos, (pronounced See-ain-foo-à-goas) in the island of Cuba, with seven American vessels, which she had captured. The captain demanded of the Spanish authorities that the cargoes, which were Spanish, should be landed immediately and the vessels delivered to him to be destroyed! The authorities decided to hold both vessels and cargo until they can send to Spain to consult the Spanish government in regard to their disposition. All the vessels were taken on the south side of Cuba, and besides those sent into Cienfuegos, one other was taken and burned.

The *Sumter* is the old *Marquis de la Habana*, one of the two Mexican steamers belonging to Miramon, which were captured by some vessels of our navy at the bombardment of Vera Cruz, March 6, 1860. The New Orleans *Picayune* of the 4th inst., gives the following account of her escape from New Orleans :—

The first vessel of our little navy—the Confederate States steamer of war *Sumter*—sailed on Saturday last on a cruise, having run the paper blockade of Lincoln abolition war steamers off the mouth of the Mississippi. As she has now made a good offing, and is far out on the ocean wave, we

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hope soon to hear of some dashing exploits in the way of captures. She has a picked crew, and her commander is known to be a most brave and valorous sailor, and he has under him a most gallant set of officers.

She is commanded by Raphael Semmes, a native of Maryland, and formerly a commander in the U. S. Navy. It is supposed she is on the look-out for the California steamers; though if she should fall in with one of them it might prove to be catching a Tartar.

GENERAL M'CLELLAN'S ADVANCE.

The Northwestern Virginia railroad extends from Parkersburg, on the Ohio river, due east 100 miles to Grafton, where it intersects with the Baltimore and Ohio railroad, at a point 198 miles west from Harper's Ferry. Our history left General McClellan's column advancing slowly from Parkersburg, the bridges of the Northwestern Virginia road having been burned by the Secessionists. When General McClellan reached Clarksburg, 82 miles east from the Ohio, he left the line of the road, and turned to the south-east, passing through Buckhannon, and proceeding towards Beverly, a small town on the west side of the Alleghany Mountains. This movement was in comformity with orders, which he had received from head-quarters, to drive the Secessionists out of Western Virginia.

BATTLE OF RICH MOUNTAIN.

As General McClellan approached Beverly, on the 11th of July, he found that a body of Secessionists, under Colonel Pegram, were intrenched across his road to oppose his advance. He detached Colonel Rosencranz, with a portion of four regiments, to make a detour through the woods, turn the enemy's intrenchments, and attack him in the rear. Colonel Rosencranz, who is a young West Point officer, executed the movement in the most successful manner; though he must have encountered serious obstacles in cutting his road through the woods, as it took him 12 hours to accomplish a march of eight miles. At three o'clock in the afternoon he reached the road about three miles in the rear of the main body of the Secessionists; but, as he descended a steep hill into the road, he was attacked by a force of some 800, who had fallen back and partly entrenched themselves to give him battle. It seems that one of General McClellan's couriers lost his way, and rode right into the Secession camp, and by this accident they obtained a knowledge of Colonel Rosencranz's movement. The battle lasted about three-quarters of an hour, resulting in the complete dispersion of the Secessionists, and the capture of their two pieces of artillery. The delay caused by this fight prevented Colonel Rosencranz from making the attack on the main body. General McClellan waited till nightfall, and then gave up the attack till next morning. In the night, however, the enemy fled through the woods, leaving their camp and everything it contained.

The following dispatches from General McClellan give the history of the subsequent operations in very brief form:

HEADQUARTERS, DEPARTMENT OF THE OHIO,
RICH MOUNTAIN, VA, 9 A. M., July 12, 1861.

COL. E. D. TOWNSEND: We are in possession of all the enemy's works up to a point in the right of Beverly. I have taken all his guns, a very large amount of wagons, tents, &c.—everything he had—a large number of prisoners, many of whom were wounded, and several officers prisoners. They lost many killed. We have lost, in all, perhaps twenty killed and fifty wounded, of whom all but two or three were in the column under Rosencranz, which turned the position. The mass of the enemy escaped through the woods, entirely disorganized. Among the prisoners is Dr. Taylor, formerly of the army. Col. Pegram was in command.

Colonel Rosencranz's column left camp yesterday morning, and marched some eight miles through the mountains, reaching the turnpike some two or three miles in rear of the enemy, defeating an advanced post, taking a couple of guns. I had a position ready for twelve guns near the main camp, and as the guns were moving up, I ascertained that the enemy had retreated. I am rapidly pushing on to Beverly, a part of Col. Rosencranz's troops being now within three miles of it.

Our success is complete, and almost bloodless. The behavior of the troops in the action and towards the prisoners was admirable.

(Signed) G. B. McCLELLAN,
Major-General Commanding.

BEVERLY, July 13, 1861.

Col. E. D. TOWNSEND, Washington, D. C.:—The success of to-day is all that I could desire. We captured six brass cannon, of which one is rifled, and all the enemy's camp equipage and transportation, even to his cups. The number of tents will probably reach two hundred, and more than sixty wagons. Their killed and wounded will amount to fully one hundred and fifty, with at least one hundred prisoners, and more coming in constantly. I know already of ten officers killed and prisoners.

Their retreat was complete I occupied Beverly by a rapid march. Garnett abandoned his camp early this morning, leaving much of his equipage. He came within a few miles of Beverly, but our rapid march turned him back in great confusion, and he is now retreating on the road to St. George.

General Morris is to follow him up closely. I have telegraphed for the two Pennsylvania regiments at Cumberland to join General Hill at Rowlesburg. The General is concentrating all his troops at Rowlesburg, and will cut off Garnett's retreat near West Union, or, if possible, at St. George.

I may say that we have driven out some ten thousand troops, strongly intrenched, with the loss of eleven killed and thirty-five wounded. Provision returns found here show Garnett's force to have been ten thousand men. They were Eastern Virginians, Georgians, Tennesseeans, and, I think, Carolinians. To-morrow I can give full details as to prisoners, &c. I trust that General Cox has by this time driven Wise out of the Kanawha Valley. In that case I shall have accomplished the object of liberating Western Virginia. I hope the General-in-Chief will approve of my operations. G. B. McCLELLAN,
Major-General, Department of Ohio.

The same day General McClellan sent the following to General Scott:

I have received from Colonel Pegram propositions for the surrender with his officers and remnant of his command, say 600 men. They are said to be extremely penitent, and determined never again to take up arms against the general government. I shall have near 800 to 1,000 prisoners to take care of when Colonel Pegram comes in. The latest accounts made the loss of the rebels, in killed, some 150.

COMPLETE ROUT OF THE SECESSIONISTS.

On Saturday, July 13th, some twelve hours after the secessionists left their camp at Laurel Hill, Gen. Morris' command, consisting of the Fourteenth Ohio, and Seventh and Ninth Indiana Volunteers, started in pursuit of the enemy. They succeeded in overtaking the rear guard at Carrick's Ford. The enemy made a stand, and a sharp conflict ensued, which lasted for twenty minutes.

By a clever maneuver on the part of Gen. Morris, of the Seventh Indiana Volunteers, the enemy were outflanked, and made a precipitate retreat. It was then that the rebel General, Garnett, in trying to rally his forces, met with his death by a rifle wound at the hands of private Francis Burlinghame, of Company E, Seventh regiment of Indiana.

The ball passed through his spine, and out at the right breast. He fell dead on the sand. His body, packed in ice, has arrived at Grafton. It was to be embalmed and kept, subject to the order of friends. He was a graduate of West Point, and formerly belonged to the United States Army.

The following is Gen. McClellan's dispatch giving the results of the victory:—

HUTTONSVILLE, Va., July 14, 1861.

Col. E. D. TOWNSEND, Assistant Adjutant-General:—

Gen. Garnett and his forces have been routed, and his baggage and one gun taken. His army are completely demoralized. Gen. Garnett was killed while attempting to rally his forces at Carrick's Ford, near St. George.

We have completely annihilated the enemy in Western Virginia.

Our loss is but 13 killed and not more than 40 wounded, while the enemy's loss is not far from 200 killed, and the number of prisoners we have taken will amount to at least 1,000. We have captured seven of the enemy's guns in all.

A portion of Garnett's forces retreated, but I look for their capture by Gen. Hill, who is in hot pursuit.

The troops that Garnett had under his command are said to be the crack regiments of Eastern Virginia, aided by Georgians, Tennesseeans and Carolinians.

Our success is complete, and I firmly believe that secession is killed in this section of the country.

GEORGE B. McCLELLAN,
Major-General U. S. A.

THE GRAND ADVANCE.

The advance of General McDowell's army from Washington, so long anticipated, has at last commenced. At half-past three o'clock in the afternoon of July 16th, General McDowell and his staff left Arlington Heights, and at nightfall his advance guard was ten miles on its way to Manassas Junction.

His force consists of 55,000 men, and an ample force of upwards of 20,000 are left to guard the entrenchments around Washington. The spirit inspired in the soldiers by this movement is shown in the fact that many of those in the hospitals left their beds and joined the march.

SCIENCE IN MODERN WARFARE.

At the Brooklyn navy yard there are a number of old brass cannon which were captured in Mexico, and preserved as trophies. Great care has been taken to give them graceful forms, and they are covered with ornaments.

In the same yard are a number of Dahlgren cannon. These are simple masses of cast-iron, without an ornament upon, and with no attempt at beauty in their forms. But how great is the contrast in the amount of brain-work represented in these two species of ordnance! The Dahlgren guns are of immense size at the breech, tapering sharply down in the neighborhood of the trunions, and terminating in a chase but slightly conical towards the muzzle. This disposition of the metal has been determined by a long and costly series of experiments, conducted in the light of an immense amount of knowledge of the properties of metals, with an intelligent consideration of the forces of expanding gases, of the laws of moving bodies, of the results of chemical decomposition and combination, nearly all of which knowledge has been acquired by mankind since the Spanish cannon were cast.

Before Capt. Rodman cast his 450-pounder cannon, illustrated on page 305 of our last volume, he made a series of experiments to determine not only the best kind of iron to be used in the casting, but also the proper form for the mammoth ordnance. The extent and variety of knowledge made available in determining the form of this simple mass of cast-iron, may be judged by the following list of only a small part of the subjects discussed in Capt. Rodman's report:

"Of the various kinds of strains to which a gun is subject at each discharge.

"Tangential strain.

"Longitudinal strain.

"Crushing force.

"Transverse strain.

"Expressions for tendencies to rupture different kinds of resistance.

"Bursting effects of different weights of powder and shot in guns of different caliber.

"Position of shot when maximum pressure is attained.

"Experiments made for the purpose of determining the relative endurance of guns made from the same iron, but melted in furnaces of different construction.

"Deflection of bars under loads equally distributed along their whole lengths.

"Thickness of metal in the breech.

"Effects of compressibility.

"Termination of bore."

After these, and over forty other subjects of a similar character, are discussed in detail, with many pages of algebraic computations, the lines of the gun are finally drawn, and the mixture of cast iron, with its number of meltings, the form of furnace, &c., is prescribed, and the gun is cast.

Even these facts give but a faint idea of the amount of knowledge and study that is embraced in the production of one of our large pieces of ordnance! The books, which it would be the grossest folly not to read before the experiments are commenced, would form no inconsiderable library.

And all this has reference to only one species of cannon, that which is adapted to sea-coast defense. The ordnance department embraces the various varieties of field artillery, with their carriages, locks, powder and projectiles, round and elongated shot, shells, case, grape, canister and shrapnell. The arming of the infantry and cavalry is a not less extensive study. All of the details of arms for all classes of soldiers have been the subject of costly experiments by the leading governments of Europe, and of elaborate discussions by the foremost minds of all civilized nations.

But the arming of soldiers is only a small portion of the art of war. The equipment, the subsistence, the organization, the transportation of armies, is each a science in itself.

All history proves that the success of military operations depends almost wholly upon the intelligence with which they are conducted. The American people, aware of this, have, with prudent forecast, made ample provision for the education in the military art of a sufficient number of our citizens to lead our armies in case of war.

The politicians who had the control of our affairs at the time of the Mexican war, set aside these men who had made the art of war the study of their lives, and entrusted the commmand of our brigades to men who had spent their lives in learning something else—lawyers and politicians like themselvvs. In this war, we rejoice to see that the popular intelligence, always in advance of that of the politicians, is indeavoring to enforce a different policy. Our educated volunteers insist on being led by skilled officers, who, if they do sacrifice the lives of their soldiers, will not do it uselessly in securing defeat.

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A BRITISH CAPTAIN ON IRON SHIPS.

A lecture on this topic, by Capt. E. P. Halstead, R. N., was lately delivered before the Royal United Service Institution. He advocated iron ships as being far superior to those of wood for strength and floatage. He asserted that the binding of the different parts of an iron ship by rivetting was a more simple and superior method to the bolting and caulking operations required for timber vessels. The rivets of an iron ship are of the same material as the vessel, and being applied when heated and soft they become constituent parts of the frame. If the rivet heads are perfectly protected inside and outside, as they can be, the joint becomes as strong as the plate, and never leaks. From the strain by the engines of screw propellers, in wooden ships, the seams are continually requiring caulking. No merchant timber propeller is now to be found in England. Capt. Halstead gives the following advantages of iron over wood for shipbuilding :—

"Greater facility for selecting any requisite standard of strength in the material used, without any process of seasoning ; greater facility in producing any form, and for producing a maximum of strength with a minimum of material ; greater lightness with equal strength ; more room in iron ships, according to outside dimensions ; shorter period required for building ; less expense in large ships ; greater durability ; less repairs ; greater security against fire and leakage, and greater facility to make any single part any strength required. Iron also affords a convenient means of making water-tight bulk heads."

There are two very serious drawbacks to the use of iron in vessels. One is the tendency of their bottoms to become foul by the adhesion of seaweeds and barnacles ; and the other is induced magnetism in the metal, which affects the compasses and tends to make them falsify the position of the vessel.

The superior durability and security of iron vessels, when well built, cannot be questioned, according to Capt. Halstead. He stated that the *Nemesis*, an iron vessel, ran upon a rock off the Land's End in 1839, by which her fore compartment was entirely filled with water, but she steamed into Mount's Bay, got the water pumped out and the leak repaired. On two subsequent occasions in China she ran upon rocks, and was saved by her iron bulk heads in each instance. The *Rainbow*, an iron steamer, has been running for 25 years ; her speed and form are unchanged, and she is still making good and profitable passages. An iron steamer 377 feet in length, 46 feet beam, and having a builder's measurement of 3,900 tuns steamed up the Thames in January last with a speed of 10½ knots per hour, drawing only two feet of water. A vessel of such capacity and light draft could not be built of wood. The *Great Eastern*, weighing 12,000 tuns, was suspended high and dry on two cradles 110 feet apart for ninety days. No less than 150 feet at one end, and 180 feet at the other, were entirely unsupported, and yet the measured deflection of the mass was only half an inch. No structure of wood could be made of such strength.

In a recent communication to the Boston *Commercial Bulletin*, by Donald McKay, advocating iron-clad frigates for the American navy, he quotes the experiences and opinions of Capt. Halstead, in favor of such vessels, who says :—

There are now before me all the data and observations taken on the spot for my own professional information, of the several trials made off Shoeburyness since January, 1859, to penetrate the sides of the floating battery *Trusty*, built in 1855, for the purposes of the Russian war, with a scantling of 25 inches of oak timber, covered with four-inch iron plates. This vessel was prepared for being fired at in the beginning of 1857. In September, 1859, attempts for two successive days were again made to penetrate the side with Sir William Armstrong's rifled 80-pounder, which, with a 12-lb. charge, had also thrown its shot more than 9,000 yards. The first day's distance was 400 yards, at which 10 shots in all were fired, only three of which, however, took effect so as to give proof of the combined resistance of the side ; but this, to the surprise of every one, was found to be so practically complete that it was judged necessary to reduce the distance for firing on the second day to 200 yards. At this range eleven shots in all were fired, some of them of 100-lb. weight and of hardened steel, but even with these *no entry could be effected*. One 80-lb. steel shot did, however, succeed in entering the ship. Its immediate predecessor had struck a joint of the plates and opened it three-fourths of an inch. On this opening, the shot in question struck fair, and within two inches of the former shot, which, besides opening the joint, had also shattered the timber ; but, althongh thus assisted, the force of the shot on entering was so expended that it only reached half way across the deck, throwing before it, however, a formidable splinter of iron ; and this single violation of the protection of the *Trusty's* side was the only result of the fourteen shots which, in the two days, took effect upon her plates.

At the trial made in June, 1860, with Mr. Whitworth's rifled 80-pounder, I was not present, but have since carefully examined the effects then produced, and found that of the three shots which took effect on the side only one entered the ship. It received no assistance from the effects of any previous shot, but where it struck outside, the plate was unsound, and where it entered inside the timber was rotten ; and though a greater power of penetration was here exhibited than in the case of the Armstrong shot, yet, like it, it entered the ship in a spent state, and reached no more than half way across the deck. 12-lb and 13-lb. charges were used on this occasion, the shot being of carefully prepared steel ; but, as in the previous trials, no shells were fired, it having been judged useless to do so where solid steel had been so completely foiled.

No ship of wood, of whatever size or force, can be expected to contend with the modern projectiles of conical and spherical shot, shell and molten iron, against even a single decked ship with sides as impenetrable as those of the *Trusty*. Even at 200 yards we have seen that favorable accident alone enables such sides to be pierced at all ; with sufficient steam speed to enable a fighting distance of 1,000 yards to be maintained, such ships must prove "invulnerable (except through their port-holes) to any gun yet known, while capable themselves of the most effective use of their powers of destruction against any opponent of wood."

Purifying Coal Oils and Gas.

A patent has lately been taken out in England by W. R. Bowditch for passing coal oil through the oxyd of manganese or the hydrates of potash, soda, baryta, &c., contained in a close vessel heated up to 380° Fah.

The best and most economical substance of all the above named, is binoxide of manganese, and the best mode of proceeding is to take the coal oil, after it has been treated with acids and alkalies in the usual way, and to distil it over the heated purifying material. When condensed, the coal oil is to be washed with alkali, and subsequently with water, upon which it becomes nearly or quite colorless, and of a pleasant odor. When the washing, as directed, does not produce an oil of good color and odor, the hot manganese or other purifying material should be changed.

The manganese should be used in pieces about the size of a walnut. By passing coal gas through a purifyer heated to 300° Fah., containing the binoxyd of manganese, it is also purified in a superior manner.

NEW METHOD OF TREATING POWDER WOUNDS.—Instead of treating powder wounds by the painful process of digging out each single grain of powder with the knife or needle, Professor Busch recommends the fomentation of the wounded part with a strong solution of corrosive sublimate. This application produces no eczematous inflammation ; some of the vesicles dry up, and others form scabs. On removing such scabs, the grains of powder are found to adhere to its under surface, and underneath it a newly-formed, spotless epidermis is found. The scabs and epidermis scales, together with the grains of powder, may then be scraped off with the spatula. Any other strongly irritating substance may be used with success. The solution of sublimate recommends itself the most, because, in using it, the degree of irritation can be controlled pretty accurately, and because, after the healing of the eczema produced by it, a white skin remains.—*Lancet and Observer*.

A MAGNIFICENT PIECE OF MASONRY.—The Union Arch, which spans a gorge over one hundred feet above the bed of the Potomac, at Cabin Joun Run, seven miles west of Washington, was planned by Captain Montgomery C. Meigs, now Quartermaster-general of the army, and is a triumph of engineering skill. It is a single arch thrown from the natural abutment of solid rock at the base of one hill to the corresponding one on the other side. It is a most beautifully proportioned stone arch, of greater span than any other in this country or Europe. That which approaches it nearest in magnificence, is the famed bridge of sandstone across the river Dee at Chester, in England—a circular arch of two hundred feet span and forty feet rise. The Union arch is circular (a segment) with a span of two hundred and twenty feet and fifty-seven feet three inches rise.

THE CONFEDERATE FLAG SNUBBED IN RUSSIA.—A letter received in Boston from Cronstadt, dated June 17, written by the mate of a ship, says : "There is a Charleston ship lying alongside of us that hoisted the flag of the Southern Confederate States, and for so doing I understand the captain was arrested and placed in the guard house by the Russian officers. They would not acknowledge or in any way recognize the flag of the confederates.

To Take the Impression of the Leaves of Plants on Paper.

Take a sheet of paper, and rub over it the thinnest possible film of oil ; then hang it up in the air to partially dry the film. Next cover the paper with lamp-black soot, or soot from a large tallow candle, by holding it extended over a smoky flame, and pressing it gently, but with care, *into* the flame, in order to cover the paper with smoke, but of course so as not to set it on fire. Having done this, put it into a damp place to take the curl out, and when cold and flat, lay on the smoky side the leaf intended to be impressed or printed ; then press with a soft wad every part of it, so as to take up a portion of the black ; this finished, place the leaf gently on a sheet of drawing-paper, and put a piece of paper and a weight of books, or pressure, upon it. When the whole is removed there will appear a very beautiful black impression, resembling a lithograph, of the leaf so treated, showing its true line, its veins and fiber, quite distinct and true to nature. Fleshy leaves of annuals, and similar plants, are better to copy than evergreens. For a more simple method of taking impressions, which possess the advantage that they may afterwards be colored by hand, instead of lamp-smoke and candle-smoke, printers' ink may be used, as was done by Kniphoff in his celebrated botanical work, which extended to some dozen volumes folio, and was published more than a century ago, and was the first successful attempt at nature-printing on a large scale. Impressions taken in printers' ink may also be colored, and Kniphoff's work was published both plain and colored.—*Septimus Piesse.*

Military Sashes and Epaulets.

There are several old regulations in our military organizations which may be abolished with great benefit to the army, and at the same time effect a considerable saving in expenditures. Thus, for example, all the commissioned officers must be provided with crimson silk sashes having huge and clumsy tassels connected with them. Now these articles are mere gewgaws and not essential for distinguishing the officers. Instead of being of any benefit they are rather an encumbrance ; as an artillery officer said to us a few days since, "confound my sash, it is always in the way." The price of such sashes range from $10 to $20, and if we take fifteen dollars as the average price, it costs $660 for sashes for the officers of a single regiment of ten companies in which third lieutenants are allowed. This amounts to no less than $66,000 in an army of 100,000 men, not including general officers ; and all this for superfluous appendages.

Huge tinsel epaulets are also not uncommon in some regiments, but it affords us pleasure to record the fact that these trash are ridiculed in Washington, and where our other armies are in active service. Large epaulets are worse than useless, and they are far more expensive than the sashes.

Nova Scotia Patent Law.

In our last number, we published the Nova Scotia Patent Law. It will be observed that its privileges only extend to residents who shall have resided therein for the period of one year, or any British subject who shall have been an inhabitant of either of the Provinces for one year previous to his application. Our correspondent, Mr. Stubs, informs us that an effort will be made to modify this feature of the law so as to allow all inventors to claim its protection. We hope this may be accomplished. There is no sort of sense or justice in such discrimination, and we hope to see it abolished.

As the law now stands, British subjects residing in Nova Scotia cannot obtain patents in the United States, simply because their law discriminates against our citizens.

The time has fully arrived when such small-beer legislation should be done away with. The world is growing older every day, and the human mind is growing more and more sick of trammels on its progress.

SPHERICAL PORTHOLES AND EMBRASURES.—A patent has been taken out in England, by G. M. Hart, for making the embrasures or openings for cannon of a circular form, and introducing into each either an entire or part of an iron sphere, so arranged as to move freely within the opening, to produce a ball and socket joint. An opening is left in the center of the iron sphere for running the fore part of the gun into it.

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The Cotton Supply of England.

Official returns just made public in England afford interesting particulars with regard to a topic which just now commands a larger share than ever of public attention, viz., the supply of raw cotton. The receipts during the last ten years have been as follows :

Year.	Total lbs.	American.
1851	757,379,749	596,638,962
1852	920,782,440	765,630,544
1853	895,288,749	658,451,796
1854	887,393,149	722,151,346
1855	891,751,952	681,629,424
1856	1,023,886,304	780,040,016
1857	969,318,896	654,758,048
1858	1,034,312,176	833,237,776
1859	1,225,989,072	961,707,264
1860	1,390,938,752	1,115,890,608

It will be observed that last year's import was the largest on record, exhibiting an increase of forty-nine per cent as compared with 1852. The supplies obtained were derived from the various sources of production in the following proportions :

Year.	American.	Indian.	Other Countries.
1851	78 per cent	16 per cent	6 per cent
1852	82 "	9 "	9 "
1853	73 "	20 "	7 "
1854	81 "	13 "	6 "
1855	66 "	16 "	8 "
1856	76 "	19 "	5 "
1857	67 "	26 "	7 "
1858	84 "	12 "	4 "
1859	78 "	16 "	6 "
1860	80 "	15 "	5 "

The expression "other countries" comprises the Brazils, Egypt, the Mediterranean, the West Indies, British Guiana, &c.

The production of British India, which sustained a severe check in the year of the great mutiny (when it reached its maximum) is now again recovering. The receipts from India are thus stated :

	Pounds.
In the year 1856	180,496,224
" 1857	250,338,144
" 1858	132,722,576
" 1859	192,230,800
" 1860	203,141,168

The receipts from the Mediterranean were last year 44,036,608 lbs., a larger total than in any previous year, with the exception of 1852, when the supplies from that source were 48,058,640 lbs.

Armory and Arms.

It may not be generally known to our readers that the destruction of the Harper's Ferry Armory leaves us only the Springfield Armory; but this, always the chief reliance and model workshop, is now (as we learn from the Springfield *Republican*) producing a greater amount of rifled muskets per month than both amories ever did before. The *Republican* says:—

When Mr. Dwight, the new superintendent, assumed charge in April, the manufacture was only 800 per month. Already he has increased its number to 3,500, and, in less than three months, will turn out 5,000 per month. Never before was its production over 2,200 a month. This great and rapid increase has been gained by filling all the shops with additional machinery and men, and by working some parts of the establishment 24 hours a day, and others from 14 to 16. Yet, while the production has already more than quadrupled, the number of workmen is little more than doubled, or advanced from nearly 300 to 650—the present number. This is the result of the men working extra hours, and the advantage which a duplication of machinery and continuous employment of it alike give.

The Springfield Armory may, therefore, soon be relied upon for 5,000 of its best rifle muskets per month; if more are desired from it, new shops must be built, as, indeed, they will be required if the number named is to be a permanent production, for the present crowded state of the shops and the unusual hours of working are alike unhealthy to the men and uneconomical to the government.

The character of the musket produced from the armory is established the world over, and leaves nothing wanting to be desired either in plan, workmanship or material. Both the musket and the machinery by which it is made have furnished the models for the first Powers of Europe. The machinery, invented at this armory by workmen at day wages, has been copied by all the armories of Europe, and is the basis of that upon which our more distinguished pistol manufacturers conduct their operations. But the comparative cheapness at which the musket is produced here for the United States government is less generally known, and will excite surprise when known. In 1851-52, when the Springfield armory produced about 25,000 muskets of the old model per year, the cost was only $9 each. This covered every expense, salaries of officers, care of grounds, &c.; everything but interest on original investment. Since then the new and more expensive rifle model has been introduced, and the production decreased to less than 10,000 a year, upon which the same general expenses had to be divided, and the cost has been from $12 to $14 per arm. But the present increase in production, with the dropping of the Maynard primer as a drawback to the usefulness of the musket, has carried down the cost, and the arm is now produced in its highest perfection for about $10. It is believed that from 75,000 to 100,000 muskets of the present model could be produced here yearly, by an enlargement and simplification of the shops, at a cost of between $8 and $9 each!

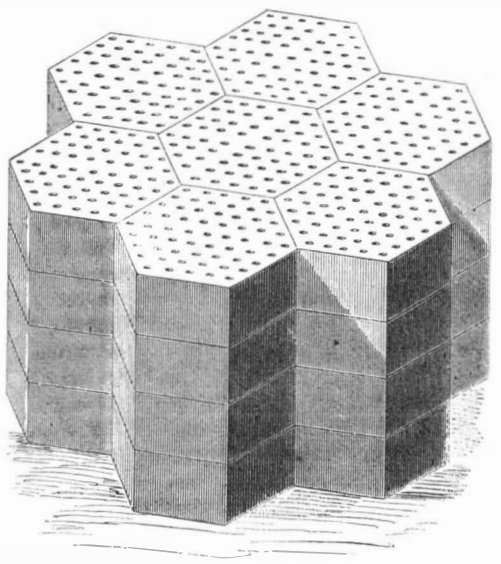
Contrast these facts with the cost of small arms at other establishments, and we shall see how greatly the United States government has reason to congratulate itself upon the economy of one branch, at least, of its public service, and how justly the Springfield Armory may claim the respect and favor of Congress. The price of the small revolving pistol and of shot guns averages $20. The cost to the English government of its rifle musket, of which it makes 100,000 a year at a single establishment, ranges from $13 to $15. This estimate is made up the same way that the cost is computed at the Springfield Armory, counting in all expenses for officers, &c., but excluding interest on buildings, machinery and lands.

The State of Massachusetts is paying $20 apiece for the English rifle muskets, which it is now importing to arm the new regiments. Yet this is an inferior arm in style and workmanship to that produced at the Springfield Armory; and though modeled upon the Enfield or English government rifle, is not made at the government establishment, but by private armories. Probably the private contracts which the War Department has made for rifle muskets is at the rate of $16 each, and is more likely to be nearer the price paid for the English imported rifles.

RODMAN'S EXPERIMENTS WITH GUNPOWDER.

When ordinary small-grained powder is burned in a cannon, the combustion is so rapid, and the gases are consequently so quickly developed and so highly heated, that an enormous pressure is produced at the breech of the gun before the ball starts from its seat; then, as the gases expand, the pressure is rapidly reduced, so that the velocity of the ball is small in proportion to the maximum pressure exerted upon the gun. It occurred to Capt. T. J. Rodman, of the Ordnance Department, U. S. A., that if the powder were made to burn a little more slowly, the pressure would be less at the breech, and would follow up the ball with more force during its passage out of the gun, thus giving greater velocity to the shot with less danger of bursting the cannon.

The first plan that he tried for producing a slower combustion of the powder was to make it in large grains, which were compressed with great force, so that they could not be permeated by the gas, and, consequently, could burn only by a gradual combus-



tion commencing on the outside and extending inward. Powder of the same quality in every respect, except the size of the grains, was prepared by the Messrs. Dupont, the grains in one sample being all three-tenths of an inch in size, those of another four-tenths, of another five-tenths, and of the last six-tenths. Capt. Rodman made a series of fires with this powder in a 11-inch gun, using the same weight of charge, 12 67-100 lbs., and the same cylindrical shot, weighing 183 3-10 lbs., at every fire. Five fires were made with powder of each size of grain, and the mean results are exhibited in the following table :

Diameter of Grain.	Velocity of Shot.	Pressure of Gas, in Pounds, At bottom of bore	At 14 in.	At 28 in.
.6	933	21,370	10,350	8,030
.5	932	21,210	11,170	7,300
.4	881	25,590	10,750	7,300
.3	890	35,330	10,710	6,680

The smallest-grained powder, three-tenths of an inch in size, produced a pressure at the bottom of the bore of 35,000 lbs. to the square inch, which was reduced to 6,700 lbs. at 28 inches from the bottom of the bore, giving a velocity to the shot of only 890 feet per second. While the powder of largest grain, six-tenths of an inch in size, though producing a pressure of only 21,000 lbs, at the bottom of bore, followed it up with 8,000 lbs. at 28 inches, and gave a velocity to the shot of 933 feet per second.

The granular form, however, is not the best for cannon powder, whatever the size of the grains. In order to give the greatest possible velocity to the shot, with such degree of pressure as may be safely employed, the pressure against the shot should continue nearly uniform throughout its passage from the gun. It should be exactly uniform were it not for the fact that a less pressure will burst a gun if applied to its whole length than is required to burst it if applied to only a portion of its length; hence the pressure should diminish as the shot recedes from the breech, but not nearly as rapidly, as the experiments show that it does diminish even with the largest-grained powder.

As the shot starts very slowly at the breech, and moves with constantly accelerated velocity in its course through the bore, in order to make the pressure uniform throughout, the gases should be evolved from the burning powder with a corresponding acceleration. But, if the powder is granular, the combustion commences on the surface of the grains and proceeds inward, constantly reducing the size of the grains, and, consequently, the extent of the burning surface. Thus the rapidity with which the gases are evolved is retarded instead of being accelerated. Capt. Rodman conceived that if the powder was formed into hollow cylinders to be fired wholly from the inside, the burning surface would be enlarged as the combustion progressed, and, consequently, the rapidity with which the gases were evolved would be accelerated. In order to confine the combustion to the interior of the cylinders, he molds them together into a cake, as represented in the cut.

The cakes are submitted to a powerful pressure in a cylinder, the plunger being armed with wires to form the holes. In practice, the axes of the cylindrical holes are parallel to that of the bore. The cakes are made from one to two inches in thickness, the cut representing four of them piled one upon another.

Capt. Rodman says that the increasing rapidity of the evolution of gas may be regulated so as to give any pressure desired along the bore, by establishing the proper relation between the number and diameter of the cylindrical holes, and the thickness of the walls between them.

"The initial burning surface, and the ratio of the maximum to the mean pressure, may also be varied by varying the number and thickness of the cakes in a given weight of charge; the initial burning surface, and the maximum pressure both increasing with the number of cakes, since the burning surface extends over the whole surface of the cakes.

"The thickness of walls between the cylinders should be such as to be burned through, or consumed, before the projectile leaves the gun; and for ordinary velocities we should economize in weight of charge, by making the walls of such thickness as to burn through by the time the projectile has traversed two-thirds or three-fourths of the bore, and allowing the gas to act expansively from there to the muzzle.

"It will readily be seen, from the foregoing, that this form of cartridge gives us entire control over the rate of combustion of the charge, a fact the importance of which can hardly be overrated; for, taken in connection with the hollow mode of casting cannon, it removes all limit, as regards safety, to the caliber, of which even cast-iron guns may be made."

PRESERVATIVE TOOTH-POWDER.—Tooth-powders, regarded as a means merely of cleansing the teeth, are most commonly placed among cosmetics; but this should not be, as they assist greatly in preserving a healthy condition of the dental machinery, and so aid in perfecting as much as possible the act of mastication. In this manner they may be considered as most useful, although they are subordinate medicinal agents. By a careful use of the following tooth-powder frequent causes of early loss of teeth will be prevented :—Take four ounces of burnt horn, two ounces of orris-root powder, one ounce of powdered myrrh, half an ounce of powdered borax, and half an ounce of cochineal. In mixing the ingredients, it is very necessary that the cochineal be thoroughly triturated with the burnt horn, prior to the addition of the other ingredients. This will require nearly an hour's careful rubbing in a mortar, and it is only complete when the color of the mixture assumes a lavender hue, which color is the best criterion of perfect blending. Finally, mix in the other powders, together with one drachm of otto of cloves; then preserve for use in stoppered bottles. The proportions given in this recipe may of course be divided into any quantity desired.—*Septimus Piesse.*

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Correspondence

A Noble Letter.

MESSRS. EDITORS :—Your letter of the 6th inst. was received with much pleasure, and perused with delight. As regards the noble, manly, independent position you have taken, I am sure it must be commended by every lover of his country, let him reside in whatever quarter of these United States Providence may have cast his lot.

In this controversy there is no middle ground for peace men to stand upon ; to my mind the point at once must be decided on, either for upholding the government in enforcing the laws, bringing evil doers —men guilty of treason, robbery and bridge burning —to condign punishment, or see this beautiful temple of our liberties, erected through the Providence of God by finite minds, utterly annihilated, and annual wars and bloodshed take its place. It is true President Lincoln was not my choice, yet he is the choice of the majority, and to them I willingly bow, believing, honestly, that he has thus far faithfully endeavored to perform the duties of his position.

We have men in our cities who are induced to become secessionists, not for the love of the thing, or the desire to see its hateful doctrines carried out, but for the amount of their investments made in Southern stocks, and their Southern customers, fearing their loss. Baltimore customers are principally Southern and Western. Large amounts are owing to her merchants by those sections, which, no doubt, caused them to love the South more than the Union ; or, in other words, the custom and money of the South. I was born in Maryland, and am the owner of slaves, *yet that investment or institution will never induce me to abandon the best of all institutions—my country and its laws —for sectional or party interest.* Our government, the best ever mortal minds produced, is surely ordained by God, and has his approving smiles, or it never would have withstood the various mad attempts made by politicians and demagogues to undermine it. Those engaged in this heaven-daring war deserve the traitor's doom, and it should surely be meted out to them. I am for the Union and a strict enforcement of its laws—nothing more, nothing less. God grant that our noble army may be safely preserved and be made victorious, and peace once more reign over our once happy land.

From the papers of to-day I see that the little army in Missouri is performing nobly—eleven hundred men put to flight six thousand rebels. The God of battles is on our side working wonders. The idea of one Southerner, in battle, being equal to five Northern men, does not hold good, and the South will find to her bitter sorrow that a great many of her wild flights of fancy are the mere delusions of an excited imagination. Southern chivalry will not stand the test. The day is not far distant when she will knock under and own her weakness and ingratitude.

I am informed it is heart-rending to behold the sad destruction made by the rebels wherever their unhallowed feet have trod, in the destruction of public and private property, merely to gratify a devilish propensity to prevent others using what they cannot. From what I can learn, in Baltimore one of the most deep and damnable schemes was concocted to destroy our government, by inveigling our State in rebellion and bloodshed. Our rebel Legislative members from the city of Baltimore have, no doubt, been well paid to secede our good old State away. Men and arms had been secured to do this deed, but thanks to an over-ruling Providence, which has brought us thus far through, their hell-deserving deed has been thwarted.

The Union men in Maryland have to stand up nobly to the good work, any faltering would give the rebels a chance to raise their impudent heads. Any quantity of aid and comfort has been afforded the rebels in Virginia by their friends in our midst ; large quantities of goods, arms, &c., have been shipped through our city for them. Government is now on the alert. Two secession editors have vamoosed—one crossed the line, with a companion, only twenty minutes before his pursuers ; the other was arrested at Sandy Hook, this side the ferry, with letters secreted in his clothing. Let hemp and bayonets do their work, and our country will be rid of men too vile to live, and peace and happiness once more possess our land. You have a few violent men at the North who deserve a similar fate—men who gloat on keeping these States in a foment. I am down on such characters ; loyal men should endeavor to keep peace, not an everlasting discord. I am in hopes, when our land is purged of such vile characters, peace and happiness will resume their wonted sway. We shall then be a happy, contented people, the envy of the world. May God in his mercy hasten on the blessed time.

G. B.

Maryland, July 16, 1861.

Another correspondent, writing to us from Chestertown, says :—

You cannot realize the satisfaction that Union men in the South feel when a favorite journal, like yours, takes such a manly and decided stand for our common country. It is a very different matter to be for the country and the flag, in our section and in the *unanimous* city of New York, and we deserve, I think, all the sympathy that our fellow-countrymen in the North have to bestow. A unanimous and unwavering North is our greatest hope, and our strongest reliance for the suppression of this crazy rebellion.

Defects of Compressed Air for City Railroads.

MESSRS. EDITORS :—There has been several articles going the rounds of the papers lately, asserting the practicability of propelling city railroad passenger cars by compressed air. Now, by a simple calculation—taking into consideration the severe grades, &c., on many of our routes, particularly at the outskirts of Philadelphia, some of which are about an inch to the foot—the impracticability of such a means of propulsion will be plainly set forth. One party, some months since, commenced the construction of a car (but have since wisely abandoned it) with an arrangement of eight receivers, placed side by side, underneath the body, said receivers having an inside diameter of 6 inches, and being in length equal to that of the vehicle, 16 feet. The calculation was, to compress the air to 500 lbs. on the inch. In order to have sufficient piston area, as the pressure became reduced, the cylinders had a bore of 6 inches, with a 12-inch stroke. Taking into consideration the weight of the receivers, engines, car, passengers, the general grades, &c., it would require an average pressure, with 30-inch driving wheels, of at least 50 lbs. to the inch on two pistons of the above diameter, a suitable device being employed, of course, to vary the cut-off as the force diminished. Now, the aggregate length of the cylinders being 2 feet, we therefore, for every revolution of the driving wheels, take out what would be equal in length to about 2½ inches of the contents of the receiver at the original pressure, and as the combined length of the latter is 128 feet, we get, by the time the force is spent, 614 revolutions, which would pass over a space of 1,535 yards, or considerably less than a mile ; so that when we reflect upon the length of an ordinary route, we find the capacity would have to be increased some five times, which would work the extra bulk and weight, such as to render it utterly a practical impossibility, to say nothing about the danger of so great a pressure on so large a scale, and the difficulty of preventing leaks at certain parts.

It would be hailed with delight by all concerned in our passenger railways, if such a motor could be brought successfully into play, but such will never be, in unlevel cities at least, as there must also be, in addition to existing grades, much friction from grit and dirt on the rails, owing to their necessary non-elevation, thus increasing the resistance still more. It has been tried in Europe years ago, under the most favorable circumstances, and pronounced a failure, even with a perfectly clean rail and level track.

Nothing that we have as yet will ever successfully replace horse-flesh in this matter but steam power, and it would be much better for ingenuity and capital to be employed in devising some method which would render steam adaptable and unobjectionable, than to waste brains and money upon that which can never prove of any real utility for the purpose. D.

West Philadelphia, Pa., July 15, 1861.

THE machinery for seven of the new gun boats is now being made at the Novelty Works, this city. The machinery for two is in a very forward state of preparation, and will soon be ready to be put in.

Condition of the Patent Office.

MESSRS. EDITORS :—Under the above caption, in your last issue, you speak flatteringly of the zeal and fidelity of Commissioner Holloway to the interests of inventors. I do not propose to take exceptions to this part of your article. I believe he intends to administer the duties of his office with reference to its best interests "without fear or favor." Yet I trust that you will allow me a brief space in your journal to offer a few remarks upon a matter that concerns not only inventors but also the public, for it must be admitted that both these interests are to be subserved in the management of the Patent Office. In spite of the good intentions of the Commissioner, I am well satisfied that this office is becoming more and more, under its present regime, an asylum for deaf and dumb fossils and political hacks. Already several of the oldest and most experienced Examiners have been removed, and I am informed that more changes are expected, based ostensibly on the plea of retrenchment ; yet it is whispered that one of these vacancies—an Examinership—will be tendered very soon to a Massachusetts politician, an ex-M. C., whose constituents had no further use for his services.

You are very well aware that there are few inducements in this country for men to devote themselves to science or abstract pursuits ; the country in general will not pay for high knowledge, but it seems to me that the few places which are open to such men, and for which they are fitted, should be given to them instead of to political favorites who have no scientific knowledge to back them. I ask, in all candor, cannot the inventor's interest be better served than by stuffing mere politicians into technical places for which they have no fitness? There is at this time, as I am informed, an Examiner in charge of an important class of mechanical inventions *who does not know an eccentric, an escapement or a ratchet and pawl.* The Act of March 2nd was intended to put men of ability into the high places of the Office, and if reports are true, it has miserably failed.

I do not think the fault is so much with Commissioner Holloway, but the combined influence of politicians who are clamoring for places are calculated to overturn the best intentions of the chief officer. Thus, you see, that through the influence of Senator Hale, who had a long-cherished political grudge, the office was deprived of the services of Mr. Little, who was known to be one of the most laborious and valuable men in the department. For many years he had abjured political life, and devoted himself entirely to his duties in the office. Mr. Little may not thank me for alluding to his case, but justice to the subject in hand requires an example.

I am not an officer in the Patent Office, and never have been, nevertheless I know considerable of its past history and present condition, and I am constrained to say that, in my judgment, there is much danger that able men in the Office will be removed to make room for stupid political hacks, who know less about technical subjects than they do of the Holy Scriptures—which makes their cases desperate in the extreme. There are many positions in the Patent Office where mere clerical ability only is needed, but men qualified for such positions will never do to fill Examinerships, unless there is an intention on the part of the Administration to reward friends with a view only to secure *temporary* advantage, for certainly the Patent Office cannot long thrive under such a system. Yours, truly, AQUINAS.

New York, July 13, 1861.

GUNBOAT INSPECTORS.—The following gentlemen have been appointed Inspectors of Gunboats by the Navy Department : Commodore Gregory, Capt. R. B. Forbes, Capt. J. J. Comstock, Jas. Rowan, Jno. Easby, Mason C. Hill, Ira Buckman, J. H. Cook and R. L. Ellis. Clark Fisher, of Trenton, has reported at Newburgh, N. Y., as superintendent of the new gunboat building there.

AN important act of the British Parliament went into operation on the first of this month, relating to boys employed in coal mines. Heretofore, boys under ten years of age could not be employed in mines ; the new act forbids their employment under twelve years of age. But boys of ten years of age may still be employed if they can read and write, and are allowed to go to school three hours a day for two days of the week, until they reach twelve years.

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A WORD ABOUT OURSELVES.

Many people imagine that these times are favorable for newspapers, owing to the fact that the news is eagerly sought for. This is not so. We verily believe that there are few newspapers now published that are actually paying their way, while we do know for a certainty that some of our leading daily papers of large circulation—larger than usual—are not paying their way, and this simply because of the falling off of the advertising patronage. A few months more of such times as these would annihilate more than half the papers now published. We have lost of course all our patronage in the seceded States, in consequence of the stoppage of the mails. Many of our readers have gone to the war; yet our subscription list has kept up better than we expected, and we owe many thanks to those of our friends who have interested themselves to get up clubs. We know that this labor has been more than usually difficult, nevertheless it has been nobly done, and we are grateful for it. We wish to emphasize what we have before said, that, *but for the patronage given to our patent agency department, we could not give a paper every week so costly as the* SCIENTIFIC AMERICAN *for so small a sum.* Our profit on each paper is very small, and it could only be made a source of remuneration except by a very large subscription list, such as we have hitherto enjoyed. Will not our friends bear this fact in mind, and work for us a little more?

Another thing. A few of our readers seem to think we ought not to use our space for details of army movements. One subscriber—John Gill, of Patriot, Ind.—discourses after this fashion:—

When my subscription is out for the SCIENTIFIC AMERICAN, you will please discontinue it. I do not know just when it expires, but it will be soon. I liked the paper very much as long as it kept to what I thought was its legitimate sphere; but since you have gone into politics it don't suit me. I get partisan newspapers on both sides daily, and they understand getting up the lies and so forth a great deal better than you do; beside, the daily papers are fresh, whereas your news is stale when it reaches this longitude. A weekly political journal is a slow coach these war times, I can assure you; and then to mix up scientific matters with Black Republican coercion doctrines is too bad—worse than amalgamation of white and negro races. Hoping you may see the folly of this course, or I may see its wisdom, I bid you a friendly farewell.

Of course, we shall comply with Mr. Gill's request. It strikes us, however, that he has mistaken his proper place of residence, if we may judge the people by the Patriot-ic name of their town. Mr. Gill is probably so terribly afraid of coercion that he would see the government destroyed, root and branch, whenever his particular candidate saw fit to do it after a defeat. Some people have just such muddy notions of the powers and importance of a government. Thank Heaven, we "train in no such company." If Mr. Breckinridge, or even Jeff. Davis, had been constitutionally chosen President of the United States, we should have yielded to the government loyal obedience, and should have justified forcible resistance to all *armed* opposition to its authority.

We have long since learned that, in the publication of a journal, it is impossible to please everybody. If we thought our readers generally preferred not to have our weekly *resumé* of the war news, we should stop it; but many who do not take the daily papers are anxious to know what is going on in the country, and, as a matter of future reference, the summary we give every week will be invaluable.

CONDITION OF THE PATENT OFFICE.

A correspondent—"Aquinas"—in a communication published in another column, animadverts upon a growing tendency on the part of Patent officials, to turn that department more and more into a political asylum. The old political war cry "to the victor belong the spoils," stimulates party zeal, and urges many an ambitious man to throw himself into the thickest part of the fight, and sustain the conflict in the "imminent deadly breach." Such men look for their reward only in the honors and emoluments of office, and it cannot be denied that modern precedent justifies an administration in filling up the offices from the ranks of its followers; but we have long maintained that the Patent Office ought to be an honorable exception in this respect; that men should be selected or retained only on the ground of qualification. The Commissioner cannot always be blamed for the character of the appointments that are made in the Patent Office. He may ofttimes have to yield to the wishes of the Secretary of the Interior, who is head over the Patent Office.

The Commissioner, however, is wholly to blame for allowing unworthy or incompetent officers to remain in the office, and we confess that even now we are puzzled to understand something in connection with this matter.

We have now before us a list of ten persons who have been quite recently removed from the Office, and we must say that we do not fully understand why it is that officers are removed against whom no opposition is raised, and some are still retained who are strongly opposed, suspected and almost despised. They remain fixed and immovable like the head of the "old man of the mountain." We suppose Commissioner Holloway fully understands why these things are so, and can manage the Office without advice from outsiders; nevertheless, we venture to speak for inventors generally, that while retrenchment seems to be necessary, owing to a decrease in the business of the Office, removals should first be made of those who are decidedly objectionable. It seems to us that thus only can the Office escape suspicion that it is not doing its whole duty faithfully and manfully.

RECENT AMERICAN INVENTIONS.

Projectile.—John Gault, of Boston, Mass., has patented an invention which consists in the construction of an elongated projectile with two or more movable sections formed by a longitudinal division of its body, and hinged at the base or rear end of the projectile, fitted with a band to keep the said sections together in a compact form previous to the insertion of the projectile in the gun and during the first part of its flight, and with a cavity or chamber within and between the said sections, to contain a charge of powder to be fired by a fuse, for the purpose of bursting said band and spreading the said sections by its explosion, that the said sections may, in the continued flight of the projectile, have a wide sweep, and make the projectile more destructive. It also consists in making such movable sections hollow, to contain gunpowder or other explosive material, and with vents leading to the aforesaid chamber, that the charges in the said sections may be fired by fuses ignited by the explosion of the charge in said chamber, for the purpose of bursting the said sections into fragments, and scattering such fragments in all directions in a suitable time after the spreading of the sections.

Boring Revolver Cylinders.—The object of this invention is to insure the boring of all the chambers of the rotating cylinders of firearms in a true circle concentric to the axis of the cylinders; and to this end, the invention consists in a certain device, combined with a revolving concentric chuck, for holding the cylinder in the requisite relation to the axis of revolution of the chuck, and permitting it to be turned to drill or bore the several chambers. Charles H. Alsop, of Middletown, Conn., is the inventor.

DE BRAME'S REVOLVING CANNON.

In the list of patent claims, on another page, will be found those of Mr. De Brame's patent for his curious cannon, illustrated on page 358, last volume, of our journal. This young and confident inventor has exhibited the most extraordinary and determined perseverance in overcoming the formidable and discouraging obstacles which he encountered in obtaining security for his invention. He had a working model constructed, and after exhibiting it to prominent military men in this city, took it to Washington, and showed its operation to the Commissioner of Patents, Examiners, and others. Though his application had been objected to, causing him repeated journeys to Washington, his last journey, he informs us, secured a decision in his favor, and he had the satisfaction of bringing his long labors to a successful issue.

The bold originality of this invention no doubt startled the Patent Office Examiner. It is something new under the sun, and the Patent Office will do well not to obstruct the progress of inventors by too many technicalities.

The Cabinet and our Generals.

There are some things that outsiders cannot possibly understand without some light from the magnates sitting in council. Why are those veteran generals Wool and Harney laid by, while important commands are entrusted to politicians like Schenck and Pierce? Is the Administration afraid its friends will be "put out" if their politicians are not made generals? How shamefully ridiculous that the government should dare to trifle with the interests of the people in this manner! General Wool's health is not good, and this may be the reason why he is shelved, but General Harney is a most efficient officer. As a field officer he is one of the most vigorous in the army, and would inspire his troops with courage such as they cannot feel while commanded by a mere political general. Epaulets, swords, tassels and gilt buttons cannot make a general in war. Science and bravery are wanted, and if, as in the case of General Harney, experience in war is desirable, then he is just the man to lead on the "Union Legions" to battle and victory. The government, in the main, has done well, but it could do better, in our opinion, if each member of the Cabinet would dismiss all selfishness and use the best means possible to save the country.

We had rather have Gen. Harney's old fighting clothes stuffed and tied to a war-horse, and placed in front of battle, than to be led on by mushroom brigadiers, who are represented as carrying into the field a guide how to fight a battle.

SAFETY CLOTHING---A SAD DEATH.

The public has been painfully startled by the sudden death of Mrs. Longfellow—wife of the distinguished poet—which took place at Cambridge, Mass., on the 10th inst. The cause of this afflicting event is thus related:—Mrs. Longfellow was seated in her library, on the 9th inst., at her residence in Cambridge, Mass., and in the act of making seals with sealing wax. A bit of paper lighted and fell upon her dress, which caught fire, and before it could be extinguished she was terribly burned. She was attended by Drs. Wyman and Johnson, of Cambridge, but their efforts were vain to alleviate her intense suffering or to save her life.

The dresses commonly worn by ladies in warm weather are composed of muslin, and such like inflammable materials. Such fabrics may be prepared at a very small cost, to render them safe against such accidents, as described on page 407, Vol. 3, present series, SCIENTIFIC AMERICAN.

The process of preparing such dresses, after they are washed, starched and dried, is to moisten them with a solution of the tungstate of soda, or the phosphate of ammonia, prior to ironing. The sulphate and carbonate of magnesia are also good substances effecting the same object, and these may also be mixed with the starch.

Although we have, on several occasions, urged the preparation of ladies dresses with such non-inflammable agents, we regret to state that but very little attention has been given to our admonitions. Upon inquiry, we have reason to believe that but very few, if any, of our American ladies have ever directed their laundresses to apply these safety substances.

The most able writers on education have complained that females pay great attention to the ornamental in dress, but very little to the really useful and convenient. We trust that the subject of safety-clothing will hereafter receive more attention from ladies. Their own safety and good sense demand this.

Improved Screw Propeller.

A patent has lately been taken out in England, by R. Griffiths, for improvements in screw propeller blades, which decrease in their width of surface as they become more distant from the shaft. It is preferred by the inventor that the propeller blade shall be a portion of the true screw of the desired pitch, excepting at the after edges of the blades, which are each composed of an angular surface, which is in its whole length at the same angle to the shaft as that at which the widest part of the blade stands to the shaft. The widest part of the blade is preferred to be at a point about one-half the radius of the screw from the center of the shaft. The angular surface at the edge of the blade commences at the widest part of the blade, and increases toward the periphery of the propeller. The angular surface stands at an inclination to the after face of the blade; consequently, as it rotates the water which has been put in motion by the fore part of the blade is again struck by the after portion of it, according to the description of the inventor. The improvement is intended to give increased efficiency to the blades of propellers.

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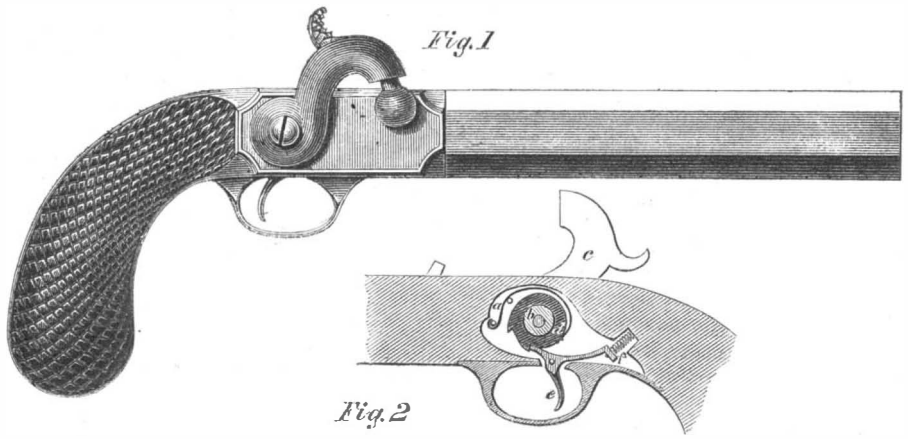
Improved Gun Lock.

The accompanying engravings represent one of the simplest and most compact gun locks that has yet been devised.

The main spring, *a*, is coiled around the shaft, *b*, to which the cock, *c*, is rigidly secured ; the tumbler, *d*, being slipped upon the same shaft, and held in place by a set screw. This mode of securing the tumbler enables the sweep of the cock, or length of arc through which it moves, to be varied and adjusted so as to give a blow of any force desired. The trigger, *e*, is pressed into the notches in the tumbler, by a spring, *f*, which may be spiral, as represented in the cut, or of the usual straight form.

The manifest advantages of this lock are its exceeding cheapness, compactness and simplicity. It is easily taken apart and put together, and if the mainspring or either of its other few pieces should be broken, it could be quickly and cheaply replaced.

The patent for this invention was granted April 30th, 1861, and further information in relation to it may be obtained by addressing the inventor, Prince Hiller, Mattapoisett, Mass.



HILLER'S GUN LOCK.

A Steamboat Present to the Government.—Benj. S. Walcott, Esq., a wealthy manufacturer, and proprietor of the New York Mills, Oneida county, N. Y., has presented to the government a steamer now lying at St. Louis, which he says cost him last year $70,000. General Prentiss, in command of the United States forces at Cairo, "takes the responsibility" of accepting the gift, on behalf of the government, remarking that "a good steamboat is and has been in constant need" at that post, and has been obtained at an exorbitant rent.

Cannon and Iron Plates in Parliament.

In the last number of the Scientific American, we stated that the published accounts of the Armstrong guns having smashed 10-inch plates must be received with great caution. Since then, we have noticed that the subject was brought up in the House of Peers, and the doubts we expressed of the correctness of the reports have been confirmed. The Earl of Hardwicke called attention to the statement made by the First Lord of the Admiralty on a previous evening to the effect that shot from guns had penetrated bars of iron eight inches thick. That statement, he understood, was felt by the iron manufacturers to be detrimental to their interests, and he was informed that these bars had been put together endways, and welded in that form, and that it was at the welded parts that the shot had penetrated.

The Duke of Somerset said that Lord Herbert and himself had appointed a committee of scientific men to test the various qualities of the iron ; and that with regard to the 8-inch plate penetrated by shot it was composed of bars which were not welded, but bolted together in the strongest possible manner. At the same time he was quite ready to admit that plates of iron six inches thick had not yet been penetrated. His reason for trying bars was, that they could be bent to the various curves of the ship's side better than bolts, without impairing their strength. All the experiments had been made with the greatest care by eminent scientific persons, who had also tried experiments upon sloping sides, to test at once the power of the gun upon them and the quality of the metal. He was present at some of those experiments the day before, and it certainly appeared that the sloping side possessed great advantages, and that the flat-headed bolts had no effect upon it.

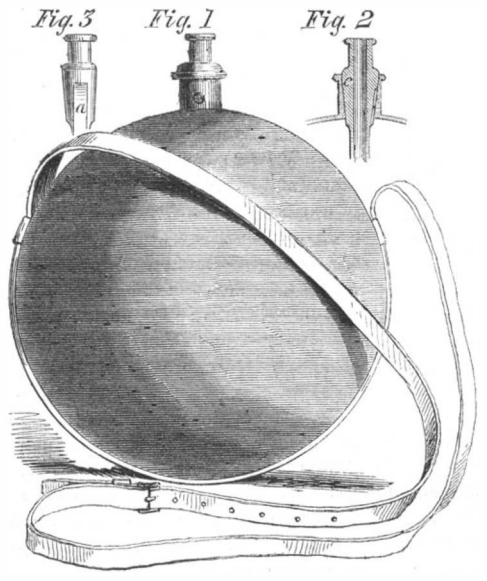
Ship Building in the Provinces.—Ther are twenty-nine ships in the course of construction at the port of St. John, N. B., and vicinity, the aggregate tunnage of which amounts to 25,210 tuns. It is estimated that one-half of the tunnage will be launched this and the ensuing month.

CASE'S TUBE FOR CANTEENS.

Perhaps there is no more awkward and inconvenient act performed than drinking from the mouth of a bottle or canteen. The tipping back of the head and the gurgling of the fluid down the throat, is only to be gone through with either in the case of very violent thirst, or for very acceptable liquor. The invention here illustrated obviates all of this awkwardness and inconvenience by an exceedingly simple arrangement. A small tube is inserted into the canteen, reaching to the bottom, and provided with a mouthpiece, through which the liquid can be drawn up into the mouth while the canteen is below the mouth, or in any other convenient position.

In the cuts, Fig. 1 represents a canteen with the tube inserted, and Fig. 2 is a section of the end of the tube. The opening through the nozzle is made conical, and an enlarged piece of metal, *c*, Fig. 2, or a piece of cork fits around the tube, and into the conical nozzle. As the liquid would not rise through the tube unless air were admitted into the canteen, provision is made for this admission of air, by cutting off a flat section on one side of the conical stopper, as shown at *a*, Fig. 3 ; a hole being made through the wall of the nozzle, so that air is admitted to the canteen, when the flat section is turned opposite this hole. The canteen is closed air tight by turning the stopper, so that the flat place upon its side will not be opposite the hole in the side of the nozzle. Simply closing the canteen air tight prevents the liquid from flowing out, though the small tube remains open ; but to prevent the entrance of any dust or dirt, the outer end of the tube may be closed with a cork.

A sponge or other suitable filter may be attached to the tube to strain the impure water, should it be necessary to fill the canteen with such. The tube will



be found convenient in drinking from brooks which may be crossed on the march.

It will be seen that this tube may be adapted to the canteens now in use at a very small expense.

The patent for this invention was granted through the Scientific American Patent Agency, July 9, 1861, and further information in relation to it may be obtained by addressing the inventor, John Case, 309 Market street, Philadelphia, Pa.

DON'T BITE THE CARTRIDGES.

In the authorized version of U. S. Infantry Tactics, published by J. B. Lippincott & Co., Philadelphia, the following directions for handling cartridges are given on page 78 :

Take the cartridge *in* (not between) the thumb and first two fingers, and place the end of it *in* the teeth. Tear the end of the cartridge down to the powder, then hold it upright," &c.

This is one of the multitudinous and unscientific movements still retained in our military tactics. A man may be young, sound in limb, strong of arm, quick of foot, keen of eye, and a first rate shot, but if he has had the misfortune to lose his front teeth by a kick or fall, the fellow, however patriotic, cannot be admitted into Uncle Sam's army, and all because he cannot bite the cartridge with his absent teeth.

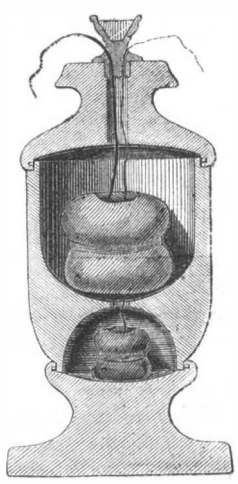
It is well known to all soldiers that the tearing of cartridges with the teeth in battle soon causes an almost intolerable thirst. It is one of the least agreeable operations to a soldier to bite a cartridge, especially if it is lubricated with grease, and we are astonished that military men should still cling with such conservative leadenheadedness to the practice when a very superior mode is known. By filing the upper edge of the handle of a fixed bayonet until it is made quite sharp, the soldier, instead of being required to bite his cartridge, can rip it open neatly and rapidly, by drawing its end upon the edge of the bayonet handle. All the bayonets used in the army should be filed as suggested ; the expense would not be over one cent for each, while the improvement would be of incalculable value if introduced into the army.

DOUBLE TWINE BOX.

We take the following description of a neat little improvement in twine boxes for counters from the London *Chemist and Druggist* :—

It consists, as shown in the sectional view, of three parts, forming two distinct cavities, adapted to the reception of coarse and fine twine.

The different parts are fastened together by short projecting pins, openings, corresponding to their positions, being cut in the overlapping rims, so that the box can be taken apart without trouble ; consequently it is not subject to the inconvenience of becoming fixed, as in the ordinary arrangement, where the lid is fastened with a screw.



The convenience of having stout and fine twine in the same box is too evident to require description ; time and trouble are so obviously saved by the arrangement, not to speak of the economy of space, in having one box instead of two on the counter.

The top is finished with a guarded cutter. The whole is formed of stout, heavy wood, not liable to overset, and is in a very elegant and artistic form.

The crew of the privateer, *Savannah*, now in prison in this city, have been indicted for piracy, and, in the state of the law and evidence, no doubt is entertained of their prompt conviction.

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WHAT GUNS ARE BEST.

It is no doubt the desire of every army and nation to possess the best implements of war, but great uncertainty prevails as to which are the most efficient. The principles of operation and the principles of mechanical construction embraced in the variety of weapons now brought before the public, are so different, and the opinions are so numerous respecting their merits, that it is very difficult to arrive at proper conclusions respecting them. A few words on this subject, to bring the matter intelligently before those in authority and the public, may be of some service.

Rifled cannon are now held to be the most efficient for artillery purposes. Their aim is more accurate and their range much greater than the old smooth-bored cannon, hence they are most destructive. It now seems to be the object of military authorities everywhere to bring them into general use, and if one army is provided with rifled cannon, its adversary must obtain similar guns or fight at a great disadvantage. For close engagements smooth-bored cannon must always be employed for firing grape and canister; therefore, although rifled cannon are the most effective at long ranges, smooth-bored guns must form a large portion of the effective artillery belonging to an army for action at close quarters.

There are two special classes of rifled cannon, respecting which there are divided opinions among military men and others. The one has a movable breech and is loaded at the rear; the other has a close cylinder behind, and is loaded at the muzzle. It is claimed for the breech-loaders that they can be loaded with less labor, are more convenient for receiving shot and shells, and that expanding shot are not required for them. The objections to them are, that they are more complicated and expensive in construction than muzzle-loaders, and they are more liable to get injured and become inoperative in action.

The greater simplicity of muzzle-loading cannon is admitted, but either winged shot or expanding shot is required for them. If muzzle-loading rifled cannon are equally as good as breech-loaders, all the sound old smooth-bored guns in our arsenals, forts and navy yards can be converted into serviceable and efficient rifled guns by simply grooving their insides, and this can be effected at a very small expense. This is, therefore, the important subject for consideration, as it now divides the opinions of very able military authorities.

The English and the Prussian governments have given their countenance to the adoption of breech-loading rifled cannon, and the Belgian government has recently proposed to expend about $3,000,000 for the re-construction of its artillery, adopting the Prussian screw-breech guns, which are said to be less dangerous in loading, more accurate in aim, and easier loaded than those which are charged at the muzzle. On the other hand, the French, Russian, Dutch and Swedish governments have adopted muzzle-loading rifled cannon, the Hollanders having converted a number of their old worn-out pieces into good rifled guns by a process which exhibits genuine economy and considerable ingenuity. In the arsenals of Holland there were a number of six-pounder bronze guns which had become so defective by use that they were condemned to be re-melted and re-cast. A happy thought struck one of the engineers. He proposed to clean out the bores and partially fill them in with a re-casting of bronze metal and then rifle them. This suggestion was carried out, and the old six-pounder defective smooth-bored cannon have been converted into rifled guns. By this simple process the Dutch have obtained from their old condemned bronze guns as efficient light field pieces as those of France and Russia, at the expense of only seven dollars for each.

Those who have advocated the muzzle-loaders and condemned those which are charged at the rear, say that the latter have been tried and condemned long ago—that they were the earliest class of guns made, therefore they should not receive that attention which is now bestowed upon them. Such a charge as this should receive but little consideration, for revolving firearms were really among the most early that were tried, and in the Tower of London there is a firearm nearly two hundred years old, which has a revolving charge chamber operated on the same principle as the most approved modern revolvers; and yet such weapons became lost to the public until revived by the improved Colt pistol.

Every firearm should be judged upon a consideration of its own merits, after repeated trials, and not by the prejudices and interests of any man or party. This is the only way to arrive at right conclusions respecting the merits of any piece of mechanism.

Having paid considerable attention to various kinds of guns, we believe that every sound gun in our country may be converted, at a trifling expense, into a good and efficient rifled cannon by the simple operation of rifling. We consider it folly to expend large sums in obtaining new rifled cannon while old ones can be rendered nearly as good as the best that are made from new materials.

The public has read accounts of the Sawyer, and James and the Hotchkiss cannon, but the guns which have received such names are common rifled cannon. The names of the inventors of the peculiar shot which were fired with rifled cannon, have been transferred to the guns by correspondents of papers unacquainted with the inventions.

In the construction of new rifled cannon for loading at the muzzle, we believe it will be found advantageous to employ a screw-breech piece, to remain fixed in firing, but which, if a shot should get fast in loading, may be removed for the purpose of getting out the charge easily. This method of making muzzle-loading cannon would be an improvement, we believe, and the same principles of construction may also be applied with advantage to small arms.

HON. JOSEPH HOLT ON THE SUPREME BENCH.

It is stated that Hon. Joseph Holt will be nominated to the seat on the Supreme Bench vacated by Judge Campbell, of Alabama. The name of Mr. Holt is familiar to all our readers, as having been formerly Commissioner of Patents, but a few more words about this noble citizen will be interesting to our readers.

Mr. Holt is still in the prime of life. He was born in 1807 in Breckinridge county, Kentucky. His parents were poor; but, like many western youth, he managed, by industry and economy, to secure to himself as good an education as Kentucky colleges afforded. He commenced to practice law at Elizabethtown, Kentucky, in 1828; removed to Louisville in 1831; and the following year, as delegate to a State Democratic Convention held at Harrodsburg, made a speech which at once gave him the reputation of an eloquent orator among a people who are proverbially fond of public speaking.

In 1833 Mr. Holt was appointed State's Attorney for Louisville and Jefferson counties, where he added greatly to his reputation both as a shrewd, clear-headed and very industrious lawyer and a fine speaker.

An honored merchant of Louisville, who was a member of the first grand jury that assembled under the Attorney Generalship of Mr. Holt, remarked to us not long ago, that his address to the jury on that occasion was a model of ability and eloquence, and furthermore that "he was a perfect terror to evil doers."

In 1835 he removed to Port Gibson, Mississippi, and thence in 1836 to Vicksburg, where he soon secured a very large practice, which brought him an ample fortune. In 1842 he returned to Louisville; travelled in Europe in 1848, and in 1856 removed to Washington. In 1857 he was appointed Commissioner of Patents, in which office he gave great satisfaction to inventors. On the death of Postmaster-General Brown, in 1859, he was placed at the head of that Department, which he managed until, in January of the present year, he was called to the head of the War Department, from which John B. Floyd had just been driven by the discovery of his treachery. How faithfully, energetically and wisely he fulfilled the duties of that important post during the short time he held it, the whole country knows. Since his retirement he has devoted himself to the establishment of a sound Union sentiment in Kentucky; and many of our readers will remember his admirable letter to James B. Clay on the powers of the government and the duties of citizens.

Mr. Holt is now in Kentucky, his native State. On Saturday, the 13th inst., he addressed an audience in Louisville, densely packing the largest hall in the city, in an unconditional Union speech, which was received with rapturous applause.

We have the pleasure of knowing Mr. Holt well, and we regard him as one of the most thoroughly upright public men in the country. He is, moreover, clear-headed, loyal-hearted, an able jurist, and an honest man. His appointment to a vacancy on the Supreme Bench would be a convincing proof of the conservative views of the Administration.

THE KETCHUM REAPER PATENT EXTENSION.

The Commissioner of Patents has decided not to extend the reaper patent for the machine known as Ketchum's Reaper, on the ground that Ketchum's assignees have achieved a sufficient reward out of the patent itself, for the value of the invention to the public, and because the proper showing as to Ketchum's emoluments from the patent was not made. It was in evidence, we hear, that a million and a quarter had been made by some party or parties out of the patent in issue.

We find the above announcement as a special dispatch to the daily press from Washington. There must be some mistake about it. Commissioner Holloway has certainly rendered no such decision. He may have denied the extension, but we cannot think the reasons for such denial are as stated. We will say, however, that we know nothing about the merits of the case, having had no connection with it; but the premises are wrong, and if Mr. Ketchum has suffered defeat on grounds such as are alleged, there is either a gross official mistake about it, or his attorneys were incompetent to manage the case. Mr. Ketchum doubtless appeared before the Commissioner and prayed for the extension of his patent on the ground that he had not been adequately remunerated. No matter how much his assignees had made out of it, they were not ostensibly parties to the extension, and should have been kept out of the way entirely. The law had nothing to do with them unless, indeed, Ketchum had sold out to them his right to the extended term, and was to derive no benefit from the extension. If the assignees *had* achieved a sufficient reward, and some party or parties *had* made a million and a quarter out of the patent, it would not make a particle of difference to Ketchum, provided he could show that, as inventor and patentee, he had not been sufficiently rewarded for his invention.

It is not an uncommon thing that assignees get all the fat and marrow out of a patent during the first term of its existence, while the inventor gets nothing but bone and gristle. Under such circumstances the law of 1836 clearly contemplates an extension of the patent for the benefit of the inventor, upon proper proof. If Ketchum's emoluments were jumbled up into an undiscoverable mass, it shows bad management; but to report that the Commissioner of Patents decided against him on the ground of somebody else having made a fortune out of the patent, is more than we can believe; therefore we look with interest for the official report.

We have no facts before us upon which to base an intelligent opinion of the merits of the decision, but this much we venture to say, that Ketchum is an honest inventor, a little past the prime of life, and, unfortunately, others have made more out of his inventions than he has. The fact is, we believe he is a poor man, which makes his case seem to be a hard one.

ONE of the Rogers locomotives lately drew, on the Illinois Central Railroad, into Chicago 58 loaded cars, the entire weight being 631 tuns.

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TELEGRAPH CABLES---BEST INSULATING MATERIAL---NEXT OCEAN TELEGRAPH.

It is well known that all the submarine cables—not even the Atlantic one excepted—have been coated with gutta percha, a substance which has been considered the very best that could be employed for such a purpose. How it came to be esteemed as such a superior material for covering telegraph cables is unknown, but the fact is undeniable. Gutta percha can be rendered soft by heat, and it may be moulded into any form, and it is easy of application to a cable, but india rubber has the same qualities, and besides this it is far more elastic, and not so liable to fracture. But the impression has got abroad that its insulating qualities were very inferior to gutta percha, hence we have one reason for the prominent position of the latter. A most valuable report on submarine cables has lately been published by the British government, being the result of investigations and experiments by a committee appointed by the Lords of the Committee of Privy Council for Trade, and in it, as reviewed by the London *Mechanics' Magazine*, we find some very interesting and valuable information respecting the best substance for conductors, and the best coating for the cables.

In this report, it is stated that, after many experiments with copper wires and alloys of copper, there is no substance which can be added to pure copper that will increase its conducting power.

As it regards the material for covering telegraph cables, it appears that india rubber was almost the first substance that had been used for covering overland wires; and the report says "it is remarkable that the first really efficient insulating substance that was used, after falling into disuse, should be now again brought forward. As in the copper for the conductor, so india rubber appeared almost specially intended for the purpose of insulation. It possesses insulating qualities of the highest order. It is tough, highly elastic, of less specific gravity than water, easily manipulated, extremely durable under water, nearly impervious to moisture, and it appeared on its first introduction as though nothing further could be desired."

The reason set forth for its disuse is stated to have been defective application. After the first failure of india rubber, gutta percha was introduced to take its place, and up to the present time it has been used as the chief insulating agent.

The report states that the committee made numerous experiments with both india rubber and gutta percha as a coating for submarine cables. It was found that pressure consolidated the material and improved the insulating qualities of both gutta—percha and india rubber. Temperature was found to produce a marked effect upon these substances in relation to the insulating powers. Thus, with the gutta percha, the insulation was not half as good at a temperature of 75° Fah. as at 52°, and not one-fourth as good at 92°. At a temperature of 32° its insulating qualities were three times as good as at 52°. These facts are of great value. The question of heat and cold as affecting the insulating powers of substances has been in a great measure overlooked. At a temperature of 132°, gutta percha covered wire was entirely spoiled. Submarine cables which have to be conveyed through warm water, such as the Gulf stream, should never be covered with gutta percha. Temperature does not affect india rubber so much as gutta percha.

These substances, however, were found to be porous under great preasure in water, and this seems to be the great difficulty to overcome so as to make them more perfect insulators. A correspondent—J. Macintosh—writing to the London *Mechanics' Magazine*, asserts there is a remedy for this evil in collodionizing conductors.

The velocity with which electricity travels through a conducting wire, is very great—for all practical purposes it is instantaneous, when there is no induction. To obtain, as a coating material for telegraph wires and cables, a substance which has the smallest amount of induction is of the highest importance. All the long submarine cables yet laid have been rendered nearly inoperative by inductive changes of electricity, which retarded the main electric current. Pure india rubber was found to surpass all other coating materials tested, "in the smallness of the amount of its inductive discharge, and the perfectness of its insulation." "In the former respect" (induction), says the report, "india rubber is fully equal to a coating of ordinary gutta percha of double its thickness."

With such reliable information as is contained in this report, we are certainly much nearer to a successful Atlantic telegraph line than we ever were before. The Atlantic cable was an expensive experiment, and its cost may be charged against the ignorance which prevailed on the subject. We can easily conceive now, that if it passed through a part of the Gulf stream. 72° Fah. in temperature, its conducting powers were rendered almost *nil*. With india rubber as the insulating agent for an Atlantic cable complete success may yet favor the next effort to lay and operate one.

COMBINATION RIFLES.

A rifle constructed with a simple mechanical arrangement for being used, as may be required, for a combined breech and muzzle loader, would be an improvement of no small importance. We have lately had evidence of the advantages which would result from such an arrangement. A breech-loading Sharp's rifle and a first-rate target rifle were being tried against one another at a mark—the breech-loader being charged at the muzzle, the breech remaining closed. In one instance the target rifle was charged with the bullet rammed down first, and it could not be withdrawn on the spot. The result was, that for that occasion the shooting with it was suspended. The same mistake also occurred in loading the other rifle, but the bullet was driven out in an instant by opening the breech, and the shooting with it was continued.

On a subsequent trial with the same rifles, the bullet of the muzzle-loader stuck fast in the middle of the barrel, in loading, and it could not be driven down with the ramrod. This also arrested shooting with it for that day. The bullet in the breech-loader (which was loaded as before, from the muzzle,) also stuck fast, about three inches above the powder, and could not be driven down with the wooden ramrod. The bullet, however, was soon driven out from the back end, by opening the breech, and forcing it back out of the muzzle. The Sharp's rifle leaked a little at the breech, and it was loaded with spherical shot, at the muzzle, to see if the leakage could be prevented. The target rifle was far more accurate, and possessed the advantages of a tight breech, but the movable breech certainly has its conveniences, and a good combination of the two would unite the qualities of both.

FOREIGN TRADE.

Reports from Europe show conclusively that foreign trade is seriously affected by the troubles existing in this country. We have been large consumers of most all kinds of foreign goods. This has been a favorite market especially for the productions of England, France and Belgium, and the time will come when this trade will be renewed, if foreign powers treat our government with proper consideration in the hour of its trial. The fact is that the city of New York alone has consumed of foreign luxuries, upon which large profits are realized, more in value than any five of the seceded States. Our disasters are due to the precipitate action of the seceded States, and it will be well for European nations to take a practical view of all the facts which have thus conspired to injure their trade and commerce with this country. As a mere matter of interest, it would have been greatly to the advantage of England and France had they offered to join hands with the Federal government in putting down this monstrous rebellion.

Twenty millions of loyal people cannot be indifferent to the highest interest of their country, and to suppose for a moment that the great water-courses of the country are to be surrendered without a severe struggle, to a foreign power on this continent, is to suppose we have lost all our manhood and self-respect.

The Mississippi river belongs to the whole people, and whatever else may be done, we do not believe that the undisputable right to navigate it will ever be surrendered so long as there is a hand to strike a blow, and the sooner the Southern States bordering that river learn this fact the better it will be for us all.

A WORD TO THE SOUTH.

We publish on another page a letter from one of the most highly respectable citizens in Maryland, touching the great questions that now disturb the whole country. He is a native of that State, and, moreover, a slaveholder, and hence his views are entitled to great weight. We need not say to our readers that we cordially endorse the sentiments which he so vigorously utters. In so doing we disclaim all partisan spirit. We never yet desired to see sectional men elevated to power. We have, however, no sort of sympathy for those who would seek to overthrow our government by armed violence, such as is now manifested. We trust it will not succeed, and we have faith to believe that it cannot. We desire this not only for ourselves but also for those who have been drawn into the secession scheme. We desire it for the sake of a free government and for the future glory and honor of the people of the United States now and forever. Divided, we are crippled in our rise and progress as a nation. United, we can all go on prosperously and defy the world in arms.

The North has nearly twenty millions of people—one-fifth able to bear arms in defence of the government. We have a navy rapidly augmenting in power, also a formidable merchant marine, with plenty of material wherewith to increase both. The Southern States are not only destitute of a navy, but also of a merchant marine, and it must, under the most favorable circumstances, require a long time to form either. Thus they would exist at the sufferance of other nations, being destitute of the power to prevent a rigid blockade of all their ports, and without power to protect their citizens in foreign lands.

We heartily and sincerely believe that the rebellion against the government is supported by a faction, and that under favorable circumstances the people of the South would prefer the government of the United States. Our correspondence from the South previous to the stoppage of the mails, confirms us in this view. It is natural it should be so, for the best interests of the South are in the Union, and when passion, which is but temporary, shall have passed away, they cannot but admit the soundness of this view of the case.

We believe the people of both sections are mainly right at heart, and have been embroiled in this serious misunderstanding through the machinations of designing politicians. If the government should undertake the destruction of any of the valuable interests of the South, its citizens would stand before the world justified in revolution. But we are certain no such design exists and never can exist, unless such interest is, without just cause, made to feed the fires of an armed rebellion.

A majority of the Southern people now in arms against the government have been goaded into the fight by a system of monstrous misrepresentation as to the designs of the North, and by a false impression that the people here were too cowardly to take up arms. This delusion is evidently passing away, for it is said, on the authority of a prisoner taken in Western Virginia, that a Georgia regiment, which was routed by Ohio and Indiana troops, were amazed at the manner in which the latter rushed into the fight.

We repeat what we have before said, that all the government wants is to have the Southern people lay down their arms, and submit to the laws as we are endeavoring to do, and not a single State would be deprived of its just rights under the Constitution. Seven-eighths of the people North would cheerfully extend to the South all the privileges they desire for themselves. No more nor less ought to be expected.

PHOTOGRAPHING THE COMET.—Mr. Whipple, a photographist of Boston, somewhat famous for his photographs of the moon and stars, has been making an effort to get a picture of the comet. He says that its photographic power of light is so feeble as scarcely to make an impression on his most sensitive preparations. As compared with that of the moon, or fixed stars even of the third or fourth magnitude, it is, photographically speaking, not one thousandth part as brilliant.

AMERICAN VESSELS IN THE CLYDE.—Notwithstanding the American troubles, the Glasgow *Herald* says that there have never been so many United States ships loading and unloading in the Clyde.

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SOUTHERN HARBORS OF THE UNITED STATES.

In *Hunt's Merchants' Magazine* for the present month, there is an article, by an officer of the Coast Survey, on the above subject, which contains some exceedingly interesting information.

It is stated that all the important cities of Virginia and Maryland have access to the ocean only through the Chesapeake Bay, which, at its entrance, measures eight miles in width. A single war frigate can close this bay against the exit or entrance of merchant vessels. One of our steam frigates, at most, with a gunboat, could close the bay against all commerce, with Fortress Monroe in possession of the government.

Beside the bays and harbors of Maryland and Virginia, there are thirty others belonging to Southern States.

NORTH CAROLINA.

Albemarle and Pamplico Sounds.—After passing Cape Henry, there are a series of low sand islands and shoals lying between the shore and the ocean, forming several sounds or long bays, navigable for vessels of light draft. The Dismal Swamp Canal connects these sounds with the Chesapeake. There are several inlets from the ocean to these bays. Hatteras Inlet is long and narrow, and has only 7 feet of water on the bar; a single gunboat of light draught could close it. Ocracoke Inlet has 10 feet of water on the bar, also opening into Pamplico Sound. The inlet to Albemarle Sound is long and shallow, and has only 5 feet of water on the bar.

Beaufort.—This harbor is inside of Topsail Inlet. It is a good haven, having over 15 feet of water on the bar at low tide. The town of Beaufort is commercially important, as it has a railway connection with Raleigh and with the various roads north and west. The entrance is defended by Fort Macon. There are several small inlets for vessels of very light draught, but one war steamer could blockade the main entrance.

Wilmington is a harbor on Cape Fear river. It has a single long, narrow channel, with two inlets. The depth of water is only about 8 feet at low tide. It is connected with the interior by railroad, and is an important commercial entrepot. Forts Johnson and Caswell, near the mouth of Cape Fear river, have been seized by the secessionists. These fortifications, however, are of very small importance.

SOUTH CAROLINA.

Georgetown.—This harbor has a single winding channel ten miles long, and varies in depth from 7 to 30 feet. The Pedee river connects it with the interior. This harbor could be easily blockaded.

Bull's Bay.—This is a good harbor, and is very accessible. The depth at low water on the bar is 13 feet; the anchorage is good in 21 feet inside.

Charleston.—This harbor has six entrances, varying from 7 to 11 feet at low water. A single steam frigate can blockade this harbor without being in danger from the forts. Charleston is connected with the interior by railroads and two rivers. It is the most important city in South Carolina, and its entrance is protected by Forts Sumter, of famous memory, and Moultrie. Charleston lies at the confluence of two rivers, and is surrounded by rice swamps. North Edisto river has 9 feet of water on its bar. There are several good harbors on St Helena Sound for vessels of light draught.

Beaufort, S. C., is situated on St. Helena Island, and is accessible by two inlets, one 17 and the other 20 feet deep; the latter being the southeast channel of Port Royal entrance. Beaufort river has an average depth of 16 feet at low water. This port has superior natural advantages to Charleston, but it has no river or railroad communication with the interior.

GEORGIA.

Savannah.—The entrance to this city is by a single channel, having a depth of only 11 feet on the bar at low water. Vessels drawing 15 feet can reach the city at high water. Savannah has connection with the interior by river and lines of railway. It is entirely surrounded by rice swamps, is difficult to approach by land, and the entrance is efficiently guarded by Fort Pulaski, on Cockspur Island. Port Jackson is three miles below the city. There are several small harbors off the coast below Savannah, but they are insignificant, as they have no important connection with the interior. Brunswick harbor, however, has a railroad partly finished, intended to connect this harbor with the national interior network of railroads, but at present it is an unimportant place.

FLORIDA.

This State has no less than ten ports, some of which are most important as stragetic points.

Fernandina.—This port is on the east side of the peninsula. It is near the entrance of St. Mary's river, which is the boundary line of Georgia. The entrance to it is a channel which has 14 feet of water on the bar, and there is a railroad 135 miles long running across the State connecting it with Cedar Keys, on the Gulf of Mexico. It is a most important point. It was proposed to make the railroad part of a great communication between New York and New Orleans; and a large steamboat, now upon the stocks at Greenpoint, with its hull nearly finished, was intended to run in the Gulf in connection with this railroad. The people of Florida, by their secession movements, have certainly "bitten off their own noses."

The *St. John's river* is really a broad arm of the sea running up into the State. The water on the bar is shallow. A single war vessel can blockade the river. St. Augustine is a place of no great importance; its harbor has two shallow inlets, and is commanded by an old fort.

Key West.—This is a harbor on an island of this name at the southern extremity of Florida. Fort Taylor guards the town and its various entrances, and it is safe in the hands of the United States government. It is of great importance as a naval station, and one of the keys of the Gulf of Mexico.

Fort Jefferson guards Tortugas harbor. It has been recently garrisoned and provisioned, and is safe. It is also a valuable stragetical position, commanding the entrances to the Gulf. There are several shallow, unimportant inlets leading to small fishing towns—such as Charlotte Harbor and Tampa Bay. The latter has a depth of 19 feet of water at the entrance, and is valuable for safe anchorage during storms.

Cedar Keys.—This is a port on the Gulf Coast. It is the termini of a railroad which crosses Florida, connecting with roads north and west. The entrance to it is narrow and shallow.

St. Mark's.—This harbor is connected with Apalachee Bay by a single narrow entrance. The depth of water on the bar is 9 feet. This port is connected with Tallahassee and the interior by railroad. A single vessel can blockade it.

In the bay of *St. Joseph's* is a very safe and capacious harbor, with good anchorage and 17 feet of water on the bar.

Apalachicola cannot be approached by vessels drawing over 8 feet. These places can easily be blockaded.

Pensacola.—This is an important place, as railroads connect it with Montgomery, Ala. The bay of Pensacola is the finest harbor on the Gulf. The water on the bar is not less than 22 feet deep, and inside it is much deeper. Santa Rosa Island, nearly 40 miles in length, throws its western extremity across the bay, leaving a single entrance 1¼ miles in width. Fort Pickens is near the extreme western end, and so situated that the entrance channel sweeps round it in a semi-circle, and vessels entering it are exposed in turn to the fire of three sides of the fort within a range of less than a mile. Fort M'Rae is on the main land opposite Fort Pickens. The Navy Yard and Fort Barrancas lie within the bay, about two-thirds of a mile from Fort Pickens, which can and does maintain a blockade of Pensacola. It is in the hands of the United States, and is a great eye-sore to the seceders.

ALABAMA.

Mobile.—This place is 40 miles west of Pensacola. The bay of Mobile is capacious, and the city is the second place of entry on the Gulf after New Orleans. The population is 25,000; the business wholly commercial. The channel to the bay is long and narrow, but the water is no less than 20 feet on the bar. Fort Morgan guards the entrance, and all vessels of heavy draught have to lie under its guns; the fort is in the hands of the secessionists. Vessels blockading this port will find it difficult to obtain safe anchorage in stormy weather.

There is a shallow sound running along the coast of the Mississippi, and there are numerous inlets connecting various places by water with New Orleans through Lake Pontchartrain, but no vessel drawing over 7 feet of water can navigate these shallow, extended bays. A considerable trade is carried on with light schooners, but the whole connection between Mobile Bay and New Orleans may be cut off with a steam gunboat.

LOUISIANA.

Mouths of the Mississippi.—There are three main passes of this river to the Gulf. At their widest divergence, they are about 22 miles apart. The water on the bars averages from 13 to 18 feet. From the bar to New Orleans, it is 120 miles. The various passes of the river converge about 12 miles from the Gulf. Three war steamers can blockade the Mississippi river. New Orleans is wholly a commercial city, and finds access to the Gulf by the river. There are two forts below the city, on either bank of the river, that were stolen by the secessionists. New Orleans has communication by railroad with the whole interior, and a railway, partly finished, connects it with Houston and Galveston, Texas.

TEXAS.

There are nine harbors and ports in Texas. Galveston is the most important, but a single vessel can blockade it easily, and the same blockade cuts off Houston.

All the entrances to ports in Texas are very shallow, and unfit for navigation by large vessels.

Rio Grande.—This river is the boundary between Texas and Mexico. It has a shifting bar at its mouth of from 5 to 7 feet in depth. Were there railroad connections through Texas to the Rio Grande, cotton and tobacco could be sent into Mexico and shipped without being subject to seizure by our blockading squadron. This is the place to look out for future smugglers.

The harbors of the Southern States are not difficult to blockade, but during the months of August and the fall and winter, very severe gales frequently prevail along the coast, and as the water is shoal for a considerable distance out to sea, it is difficult for large vessels to maintain a strict lookout close to the coast; hence the necessity for building so many new steam gunboats of light draught.

SOUTHEHN HONESTY.

Mr. Russell, correspondent of the London *Times*, stated, in one of his letters from New Orleans, that British subjects had been forced into the army of the Confederate States. The *Picayune* denied this statement, but the British Consul at New Orleans has published a letter in which he corroborates Mr. Russell's assertions.

It hurts the secessionists to have the truth told about them, fearing its effects upon their cause abroad; they deny everything that sounds bad. We can tell the *Picayune* in plain terms that an acquaintance of ours was robbed in New Orleans at a hotel, not long ago, of over $3,000 by Collector Hatch, in the shape of a levy upon goods taken to that city long before the passage of the Confederate tariff; and, furthermore, after the duties were so paid, our friend had to flee the city for safety, and was not allowed to bring away with him a single dollar's worth of his merchandise; and, what is still worse, he never expects to see it again. How can honest citizens hesitate to denounce such rascality as this? We will do so if we never have another reader for our journal.

We wish, however, not to be misunderstood. We believe the people of the South generally abhor such acts of public robbery as this; but politicians, in their desperation, will do anything wherewith to "raise the wind."

CANADIAN PATENTS.—We are indebted to Dunbar Browne, Esq., of Montreal, for a volume containing brief descriptions and illustrations of all the patents granted in Canada from 1824 to 1849. The whole number comprises 257, mostly very simple contrivances. The laws of Canada are not favorable to the promotion of inventions. If they were based upon a more liberal spirit, many more patents would no doubt be secured.

AT a late meeting of the American Photographical Society, held in this city, Mr. Seely stated that he had specimens of coal oil which were lighter and more volatile than ether. "These were dangerous to use in common lamps, and manufacturers should be restrained by law from mixing them with *burning fluids*."

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The Wild Silk Worms of India, made use of in Manufacturing the Material for Clothing Worn by the Middle and Lower Classes.

We have before us a fragment of the silken cloth woven from the threads of one of the *Tussah*, or wild silk worms of India, sent us by Dr. Eights, of Albany. He says:—

I send you samples from three distinct species, which are to be found in all the western forests, extending from Ramghur to Midnapore; the cocoons of each are collected in the month of September.

The first of these (which, in the language of the country, is termed the *Mooga*) is the most common and plentiful; the thread is coarse in its texture, but can be wound with the greatest facility. The cocoons are obtained directly from the trees of the forest, and are sold in an unprepared state to the purchasers. The caterpillars are to be found freely feeding upon the leaves of the ashan, saul and sejah trees, being frequently placed on their branches when found elsewhere for that purpose. These larvæ commence spinning their cocoons about the middle of the month, and complete the process near its close; they are then collected, and placed in boiling water to destroy the grub.

The *Teerah* is the second species. It furnishes a much smaller cocoon, and is supposed by many to be the male of the former. The thread is represented as being much finer in texture, but not so easily reeled.

The third is the *Bonbunda*, the largest of the wild silkworms in the country, and from which the present specimen of silk cloth was obtained. This is the species that bears so close an alliance to the *Saturnia cecropia* of this country, spoken of in a former article. In its wild state, the cocoon is of much larger size than any of the cultivated species. In some seasons, it is to be found in considerable quantities; but it is generally scarce. This is supposed to be owing to the depredations of many of the feathered races, who esteem them highly as an article of food.

These three species, belonging to the same genus, are termed by the natives, the "rainy weather" varieties; but there are others peculiar to the dry months, which, by way of distinction, are called the *Dabbo* and the *Buggoy*.

The former of these yields a fine thread and an excellent cocoon. The chrysalis begins to eat its way through the pod from the 8th of June to the termination of the month, and spins its mantle from the middle to the end of August.

The *Buggoy* is of a light drab color, giving out a fine thread, and very soft; so much so as almost to equal in value the cocoon of the mulberry silk-spinning moth, particularly those reared in the vicinity of Singhboom. It approaches so near to the pure silk that the weavers are said to mix it frequently with the real, in the proportion of one thread to three, at their manufactories. The seed is procured in August and September; spinning begins in the middle and is completed by the end of November.

There is another inferior species gathered in December, called the *Yarroy*. It is a small cocoon, and difficult to wind; the thread, also, being exceedingly harsh. The seed is procured in the month of October, and the caterpillars spin their cocoons from the 15th to the close of December. It is held in less estimation than any of the other species. The natives, in preparing the silk for use, boil the cocoon in an alkali until it shells off, and the threads appear to separate.

Paraffine Oils for Lubrication and Cartridges.

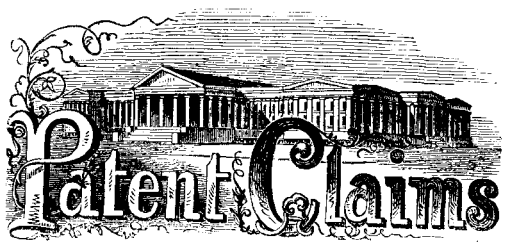
In the patent of James Young—the first one obtained for the manufacture of coal oils—he calls such coal products "paraffine oils." Perhaps this is really the best name which can be applied to the heavy oils so obtained, as they contain a great quantity of paraffine. This peculiar substance is derived from the refined coal oils, by freezing them with ice, then submitting them to severe pressure in bags. The paraffine is thus obtained in cakes, and, when bleached, is a most beautiful white substance, resembling spermaciti.

Paraffine is almost unalterable in its character in contact with the atmosphere; hence it is perhaps the best substance which can be used to protect the surfaces of polished steel and iron. Paraffine oils may be retained in contact with polished iron without causing it to tarnish. In the machines employed at Woolwich, Eng., for making bullets for Enfield rifles, by compression, out of solid bars of lead, paraffine oil is exclusively used for lubrication of the dies, because it produces no chemical action upon the lead.

A patent has lately been taken out in England for the use of paraffine as a lubricating agent for army cartridges. The inventor states that the heat of the ignited powder completely volatilizes the paraffine, and it leaves no residue in the barrel of the rifle.

CAPT. DEGROOT, who sold the *Reliance* and *Resolute* steamboats to the government, is about building two large steamers which he intends to cover with steel plates four inches in thickness, to render the vessels shellproof. So says the *Herald*, of the 9th inst.

A PUBLIC trial of chain cables lately took place at Tipton, England, at the chain-works of H. P. Parks. Four sizes of links were proved; the smallest ½-inch, the second ⅝, third ¾, and one-inch. The first broke with a pressure of 8 tuns 10 cwt.; the second with 17 tuns; the third, 28 tuns; the fourth, 32 tuns.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JULY 2, 1861.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

1,668.—Bernard Ackerman, of New York City, for an Improvement in Lithographic Power Presses:

I claim, first, The manner of setting the tympan frame, N, and tympan, N′, gripers, U′, &c., in motion, without interrupting the motion of the gears, K, and therefore leaving them continually geared with the racks, I, substantially as described.

Second, The manner of operating the scraper, Q′, by means of the cam, O, attached to the revolving tympan frame, N, or part thereof, which cam is connected to the scraper box, P, by means of a dovetailed pin and roller, set in motion by said cam, O, or its equivalent, the whole as described.

Third, I claim the method of fastening the scraper, Q′, in the scraper-box, P, by means of the vice-shaped pieces, Q.

Fourth, The manner of adjusting the bed, G, receiving the stone, H, by means of the double wedge, F′, moved by a screw, so that by turning the screw forward or backward, the bed, G, is raised or lowered. The same arrangement also used for regulating the pressure.

Fifth, The manner of carrying the sheet of paper off, after the gripers, U, have let loose, by means of the rollers, r s, the arms, q, and cam, T, attached to the tympan frame, N, or part thereof, and operating substantially as described.

Sixth, The disposition of the double ink-fountain, two cylinders and four rollers rolling the stone, the whole disposed in reference to cylinder, L, as shown and described.

Seventh, The manner of operating the carriage, F, by means of the two internal racks, E, and guides, E′, the whole as described.

Eighth, The manner of operating the fly by means of the inclined slotted lever, V, the roller, u, the connecting pieces, x and y, substantially as described.

Ninth, I claim the position of the damping roller, 8, behind the cylinder in order to get a better damping of the stone, such rolling over the stone both ways, whereas, being in front of the cylinder, L, it can roll but once over stone.

1,669.—Augustus Adams, of Sandwich, Ill., for an Improved Horse-Power:

I claim the attachment of each of the driving levers to the opposite sides of the crown of the driving wheel, in the manner described and for the purpose specified.

And I also claim the shifting shaft, n, when used for transmitting the motion of either of two or more revolving shafts, substantially as and for purpose described.

1,670.—Walter Aiken, of Franklin, N. H., for an Improvement in Knitting Machines:

I claim, in knitting machines, the vibrating frame, E, with its system of gearing and friction pulleys, for alternately operating and releasing the take-up rollers, substantially as above described.

I also claim operating the belt-shifting apparatus, by means of the vibration of the take-up frame, E, through the action of the adjustable pin or screw, e, on the latch, a, and its connections, substantially as described.

1,671.—Charles H. Alsop, of Middletown, Conn., for an Improved Chuck for Boring Fire-Arm Cylinders.

I claim the cylindrical clamp, E, with its flexible jaws, k, conical external portion, i i, and internally conical ring, F, the lever, H; and stirrup-screw, J, or their equivalent, and the rigid central pin, K, the whole combined and applied in connection with the eccentric plate, C, of the lathe chuck, substantially as and for the purpose specified.

1,672.—N. Aubin, of Albany, N. Y., for an Improvement in Dry Gas Holders:

I claim a dry gas holder composed of a lower and rigid vessel, and an upper flexible vessel, attached each to the other, and constructed and operating substantially in the manner described, by the combined action of the pressure of the gas and that of a disk, or weight, and this I claim, irrespective of the precise method of attaching the edge of one vessel to the edge of the other.

1,673.—Jerome and Gilbert Bacon, of Medina, Wis., for an Improved Washing Machine:

I claim the arrangement of the self-adjusting sliding journal boxes, D, in combination with the crank-shaft, C, pounders, A A, and tub, B, constructed and operating in the manner and for the purpose shown and described.

1,674.—Charles Bentz, of Mindenville, N. Y., for an Improvement in Whiffle-Tree Hooks:

I claim the arrangement of the spring, H, cockeye, G, lever, F, and bed-piece, B, when they are attached to the whiffle-tree, A, and made to operate in the manner and for the purposes within described.

1,675.—Charles N. Brock, of Philadelphia, Pa., for an Improvement in Apparatus for Revivifying Bone-Black:

I claim the combination of the perforated receiving vessel, A, and diaphragm or screen, E, with the supply pipe or vessel, D, the air-pipe, B, and fan, C, substantially in the manner and for the purpose shown and described.

[The ordinary process of revivifying bone-black used in sugar refining, consists in burning and washing. By burning, a large portion of the impurities are driven off, in the form of gas, but a considerable quantity, (lime, caramel, &c.,) though separated, remains distributed in the state of fine dust, over and among the grains of the black, and can be but very imperfectly extracted by washing. Washing has sometimes been performed before burning, but this fails to extract much of the impurity. This invention consists in extracting the impurities remaining after burning, by causing the black, in the dry condition in which it leaves the kiln, to fall through an upward current of air, produced by a fan, stack draft, air-pump or other suitable agency.]

1,676.—Charles Busher, of Philadelphia, Pa., for an Improved Machine for Loading Coal, &c.:

I claim, first, The arrangement of an elevator, B, and conveyer, D, with a circular moving conveyer, H, substantially in the manner and for the purpose described.

Second, I claim the arrangement of the conveyer, H, capable of turning at one end around a center, and supporting the other end upon a circular railway, in the manner and for the purpose herein described.

1,677.—Thomas Castor, of Philadelphia, Pa., for an Improvement in opening Railroad Car Doors:

I claim the combination of the lever, C, upon the front of the car, and the double sliding doors, B B, when connected by a suitable combination of levers to open and close the doors substantially as herein described.

1,678.—Frank Colligon, of Buffalo, N. Y., for an Improved Steam Boiler:

I claim the arrangement of a supplemental flue boiler within the large flue space of an ordinary steam boiler and connecting the two boilers together in such a manner that the flame and heat from the fire shall first pass through the flues of, and around the supplemental boiler and be then returned under the outer boiler to near its front end, and thence returned over the sides of the outer boiler to the chimney, and so that the water and steam may freely pass from one boiler to the other, for the purposes and substantially as described.

Second, I also claim connecting the supplemental boiler to the outer boiler by means of the pipes, G H I, in the manner and for the purposes substantially set forth.

1,679.—William F. Converse, of Harrison, Ohio, for an Improved Bed Bottom:

I claim, first, Forming a tight, elastic cord or wire bottom for beds, chairs, lounges, &c., by forcing and securing the cord or wire into a series of alternate deflections, by means of the open link, D, substantially as described.

Second, I claim the pin, Fig. 2, and strips, a a′ b b′, constructed and attached substantially as and for the purpose stated.

1,680.—D. A. Danforth and Wm. A. Wilkinson, of Elkhart, Ind., for an Improvement in Stump Extractors:

We claim the arrangement of the lever, L, and braces, P P, in connection with cog-wheels, J, movable check, or bite, B, and hook, C, all being arranged and secured, as set forth in this application and described in the drawings.

1,681.—J. A. de Brame, of New York City, for an Improvement in Fire-Arms:

I claim, first, The construction of any portion of the length of the barrel of a piece of ordnance or fire-arm, of skeleton form, substantially as specified.

Second, The combination in a piece of ordinance, or fire-arm, with a movable chambered breech, of a chamber or chambers of ordinary construction—that is to say, without openings in the sides, and a stationary barrel of skeleton form, substantially as specified.

[See engraving on page 285, Vol. 4, new series.]

1,682.—Frank Dibben, of New York City, for an Improvement in the Method of Amalgamating Ores of the Precious Metals:

I claim the process of amalgamating a precious metal contained in a finely divided matrix by depositing or "throwing down" mercury thereon from a soluable salt of mercury by local electro-chemical action induced between the precious metal and particles of zinc or other suitable material distributed throughout the mass to serve as a positive pole or a node, substantially as and for the purpose set forth.

1,683.—Andrew Foster, of New York City, for an Improved Bedstead:

I claim a bedstead constructed as shown, in combination with the S-shaped springs and slats, the whole arrange and operated as and for the purpose set forth.

1,684.—J. S. Foster, of Vallicita, Cal., for an Improved Machine for Felling Trees:

I claim the carriage, C, carrying the cutter, G, and the pulleys, E e, for operating this cutter in combination with the weight, b, frame, C, and clamps, h h, all arranged and operating substantially as and for the purposes specified.

[This invention relates to a novel machine for felling trees, and cutting the trees up into logs. It consists in a rotary cutter, sliding weighted carriage or frame, and a driving wheel for operating said cutter, the whole being combined with and mounted on a portable frame or table furnished with suitable clamps for securing it to the trunk of a tree.]

1,685.—John Gault, of Boston, Mass., for Improved Projectiles for Ordnance:

I claim, first, The combination of the hinged movable sections, A A, and the chamber, b, to contain a charge of powder within said sections, substantially as and for the purpose set forth.

Second, The soft-metal band, D, fitted to a groove, e e, in the said hinged movable sections, A A, and serving the two purposes of confining the said sections and a packing-ring, substantially as herein specified.

Third, The combination with the movable sections, A A, of the breeching, E, applied substantially as and for the purpose herein specified.

Fourth, The construction of the movable sections, A A, with chambers, G G, connected with the central chamber, b, by vents, j j, substantially as and for the purpose described.

1,686.—Andrew Hartupee, of Pittsburg, Pa., for am Improvement in Valve Gear of Steam Engines:

I claim the use of lifters for puppet valves of steam engines so constructed and arranged in relation to the shaft on which they are placed and by which they are operated, as that their extremities shall be in the line of an arc of a circle, the tangential point of which, where it intersects said shaft, shall pass within the circumference of the shaft, and either through its axis or near thereto, for the purpose hereinbefore set forth.

1,687.—J. C. Henderson, of Albany, N. Y., for an Improvement in Stoves:

I claim, first, The arrangement of the ovens, i and k, and flues, n n, and p, and damper, l, in the manner and for the purposes specified.

Second, I claim the arrangement of the deflector, r, and plates, t t, in combination with the flues, p and n n, for directing the draft as it passes around the oven, k, so as to equalize the heat, as set forth.

Third, I claim the arrangement of the grate, g. front-plate, x, and register, 5 4, in the manner and for the purpose specified.

1,688.—David Hinkle, of New Pittsburg, Ohio, for an Improvement in Clover Harvesters:

I claim, first, The employment of the packing attachment, F, arranged and operated in conjunction with reel, B, substantially as and for the purpose set forth.

Second, The arrangement of the packing attachment, F, in combination with guides, d d, reel, B, knife, a, and lever, G, when all shall be constructed and operated in the manner and for the purpose specified.

1,689.—G. C. Howard, of Philadelphia, Pa., for an Improvement in Machines for Perforating Paper:

I claim, first, The reciprocating crosshead, H, its adjustable plates, I and I′, with their punches, in combination with the adjustable perforated stripper plates, J and J′, and the adjustable plates, M and M′, the whole constructed and arranged substantially as set forth, for the purpose specified.

Second, In combination with the vertically reciprocating punches, I claim the endless apron, R, and endless carrying bands, d2 and e, arranged and operating substantially as and for the purpose set forth.

Third, I claim registering the sheet prior to being submitted to the action of the punches, by means of the printed matter on the sheet, with the aid of any convenient number of registering arms, 9 10 and 11, or their equivalents, as described.

Fourth, The lever, w, hung to the frame of the machine, in combination with the arm, x, on the driving shaft, and the notched strap bar, t, for the purpose specified.

Fifth, The arm, 4, the weighted dog, 5, or its equivalent, and the adjustable arm, 3, or its equivalent, in combination with the feed wheel, 6, the whole being arranged and operating substantially as and for the purpose set forth.

1,690.—Wm. S. Hudson, of Paterson, N. J., for an Improvement in Manufacturing Tube Sheets for Boilers:

I claim the described method of producing a rolled metal sheet, one part of which is uniformly of one thickness, and another part of which is uniformly of another and different thickness; that is to say, first rolling the entire sheet to the thickness required for the thick portion, and afterward rolling two sheets with the portions required to be thinner, superposed one upon the other, substantially as set forth.

1,691.—John Hutchison, of Matteawan, N. Y., for an Improved Boat:

I claim a boat, A, made of splints, a, of hickory or other suitable wood, connected and woven together in the manner of ordinary basket work, and strengthened by a keel, b and longitudinal central strip, c, and by a gunwale, e, and covered over with india-rubber cloth or other watertight material, all in the manner shown and described.

[This invention consists in a boat made of splints of wood woven together or connected in the manner of ordinary basket work, and covered with india-rubber cloth or any other suitable material impregnable to water, thereby rendering the boat exceedingly light and buoyant, and sufficiently strong to carry a comparatively heavy load; while, at the same time, the sides of the boat are of such a nature that they are not liable to be stove in by coming in contact with another vessel.]

1,692.—T. A. Jebb and Abner Cutler, of Buffalo, N. Y., for an Improved Skate:

We claim, first, The combination of the spring, I, with the skate, the

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said spring and skate being so constructed and used that the said spring shall be placed back of the leg, and be connected to the leg and heel of the skate for the purposes and substantially as set forth.

Second, We claim a heel support, c', made longitudinally adjustable on the skate runner, in combination with the metallic stirrup, H, for the purposes and substantially as described.

1,693.—T. A. Jebb, of Buffalo, N. Y., for an Improved Churn:

I claim the described arrangement of the water tubes, A A, air tube, B, and dash blades, G G G, within the churn tub, so that a space may be left between the said tubes and the sides of the churn tub, and so that the lower dash blade shall revolve under the lower ends of said tubes, while the other dash blades shall revolve in the space between said tubes, as set forth.

1,694.—Nathaniel Johnson, of New York City, for an Improved Camp Stool:

I claim the use or employment of the central ball, B, in combination with the legs, A A A, and seat, C, when the same shall be constructed and operated as specified, for the purpose specified.

1,695.—A. W. P. Ladd, of San Francisco, Cal., for an Improvement in Faucets:

I claim the combination of a faucet and auger, B, with a horn or projection, C, when arranged in relation to each other as and for the purpose described.

1,696.—J. E. Layton, of Pittsburgh, Pa., for an Improvement in Fire Places:

I claim the arrangement, in the construction of open fire places, of a fire basket placed in front of the throat of the flue, a back wall sloping backward from the top of the fire basket to the back of the throat, and the throat also sloping backward, as described.

1,697.—John Lippincott, of Pittsburgh, Pa., for an Improvement in the Manufacture of Shovels and Spades:

I claim making shovels or spades with an exterior coating of tin, as a new article of manufacture.

1,698.—James McIntire, of New York City, for an Improvement in Bomb Shells:

I claim the employment of two or more shells, a b c, kept apart by the projections, 1 and 2, in the manner specified, and forming a bomb, for the purposes and as set forth.

1,699.—G. A. Meacham, of New York City, for an Improvement in Buttons:

I claim, first, A button composed of the face plate, A, partially open back, B, revolving flexible eye, M, and the part, E, or its equivalent, for supporting and retaining M, constructed and operating together substantially as and for the purpose set forth.

Second, I also claim in buttons, substantially of the character described, the use of the guard, e, upon the ring, E, for the purpose of preventing the abrasive action of B upon M, as specified.

1,700.—Joshua Merrill, of Boston, Mass., for an Improvement in the Distillation of Hydro-carbon Oils:

I claim the described mode substantially of using caustic alkali, by aid of a pan, as set forth.

1,701.—Joshua Merrill, of Boston, Mass., for an Improvement in the Manufacture of Hydro-carbon Oils:

I claim the described improvement in the process of purifying hydrocarbon oils, by treating the first distillate with acid residues, substantially as described.

1,702.—Joshua Merrill, of Boston, Mass., for an Improvement in the Construction of Stills:

I claim the formed seamless wrought iron still bottom, substantially as described, and substantially for the purposes set forth.

I also claim the still as a whole, consisting of a cast iron top, wrought iron sides, and wrought iron seamless bottom, combined together by angle iron couplings, substantially as described, for the purpose of making a comparatively light and durable hydro-carbon oil still.

1,703.—Wm. K. Miller, of Canton, Ohio, for an Improvement in Harvesters:

I claim, first, In combination with the main frame, A, and the hinged frame, J J, the third frame, M, hinged to the hinged frame, J, so that each may have motion independent of the other, substantially as described.

Second, I also claim the hinged plate, Z, serving as a common support to the reel post, V, and to the pulley, 8, substantially as represented.

Third, I also claim the construction and arrangement of the reel, W, reel support, V, swinging on the pin, v, and driving belt, 7, geared back to or near the hinge of the said reel support, and thence to the pulley, 9, on the main frame, for the purpose of allowing the reel to accommodate itself to the rising and falling of the platform, and still keep the belt taut, as described and represented.

1,704.—Orson Morgan, of Henry, Ill., for an Improved Horse-collar Block:

I claim the construction of a horse-collar block in parts arranged in the manner described, that they may be expanded uniformly and retain the same relative proportions of length and breadth and shape, to suit the various sizes of collars.

Second, The sliding carriage, H, constructed substantially as described, with the spurs, h, for clamping the ends or points of the collar, and the lever, K, by which the rope, k k, is tightened into the hames groove.

1,705.—Francis Nichols, of New London, Conn., for an Improvement in Soda Water Apparatuses:

I claim, first, Combining the draft tube casing, B, with the cooler, C, which cools the pipe from the fountain, by means of a system of pipes by which the said casing is caused to form a portion of a siphon, substantially as and for the purpose specified.

Second, Combining the casing, J, which surrounds the sirup vessels, with the cooler, C, by means of a system of pipes, by which the said casing is made to form a portion of a siphon, substantially as specified.

Third, Combining the casings, B and J, with each other and with the cooler, C, by a system of pipes which makes both of said casings constitute portions of the same siphon, substantially as and for the purpose specified.

[This invention consists in so combining the casing of the draft tube with the cooler, by means of suitable pipes, that the said casing is made to constitute a portion of a siphon through which the waste ice water from the cooler is caused to circulate for the purpose of keeping the draft tube cool. It also consists in so constructing a casing surrounding the sirup vessels, and so combining the same with the cooler by means of pipes, as to make the said casing form a portion of a siphon by which the ice water is caused to be drawn from the cooler, the latter siphon being the same by which the ice water is drawn through the casing of the draft tube, or a separate one.]

1,706.—H. L. Paddock, of Pontiac, Mich., for an Improvement in Felling Guides for Sewing Machines:

I claim a felling guide composed of a scroll, D, and two straight edges, d and f, combined and arranged relatively to each other substantially as described.

[This invention consists in a peculiar combination and arrangement of a straight edge and taper scroll for turning the edge of the cloth to form the fell and folding the fell in a line parallel with the seam, as the cloth is moved forward toward the needle by the feed instrument; also, in the peculiar arrangement, in connection with such straight edge and scroll, of a second straight edge for keeping the edge of the fell in its place, and for guiding it close to the needle while being sewed. This felling guide may be attached to the stationary arm of the sewing machine, to the presser, or to an ordinary gage, as may be most convenient, according to the form or construction of the machine.]

1,707.—M. M. Parrish, of Pleasantville, N. Y., for an Improvement in Machines for Cutting Stone:

I claim the employment of the vibrating weighted serrated curved cutter, T, constructed as described, in combination with an adjustable weighted table, for the purpose and substantially as set forth.

1,708.—Wm. Patton, of Towanda, Pa., for an Improved Shutter and Door Fastener:

I claim the arrangement, as described, of semi-circular band, A, with notches in its periphery to receive the catch, B, at the end of the bent lever, C, attached to the window or door.

I also claim the above arrangement with receptacle, D, for the purpose as specified.

1,709.—J. S. Rand, of North Providence, R. I., for an Improvement in Water Elevators:

I claim the combination of the bucket, A, constructed as described, with the arms, C, trough, B, bar, F, latches, H, shaft, K, and arm, m, in the manner and for the purpose set forth.

1,710.—T. S. and T. W. Rappelye, of Farmer, N. Y., for an Improvment in Plows:

We claim the combination of the two, A D, when arranged substantially as shown, to wit: the share or plow, D, having its foot or standard, C, secured to the bar or beam, B, by means of the lip, d, and the screw, e, passing through the slot, f, into the bar or beam, B, and the front end of the bar or beam, B, attached to the back part of the beam, a, of plow, A, by means of the screw, c, and lips, b b, for the purpose specified.

[This invention relates to a new and improved combination of a surface and subsoil plow, in which it is designed to have the subsoil portion comprised of an attachment so arranged that it may be readily applied to any plow, and detached therefrom with facility.]

1,711.—E. C. Williams, of Jersey City, N. J., assignor to James Flanagan, of New York City, for a Tent:

I claim the waterproof cloth or canvas of the form shown and described, in combination with the jointed cross props, foot prop, cords and pegs, arranged to form a portable tent or covering for troops, substantially as specified.

[See engraving on page 360, Vol. IV.]

1,712.—J. W. Redding, of Belleville, Ohio, for an Improvement in Pumps:

I claim the cylinders, B B, flaring at top and united at bottom by curve, C, into which flows the induction pipe or cylinder, e; also, the confluent pipes, E E, air chamber, H, and discharge pipe, I, all combined and arranged as described, when operated by means of the fulcrum, M, piston rods, N N, pitman, P, crank, O, and wheel, R.

1,713.—G. M. Rhoades, of Hamilton, N. Y., for an Improvement in Butter-workers:

I claim, first, The particular form of compresser, A, made by four narrow angular strips attached to a square shaft, as set forth.

Second, The combination of the car, c, with the compresser, A, and tray, M, by means of the track, E, and upper and lower friction rollers, H H and j j, arranged substantially as set forth.

Third, The mode of connecting and disconnecting the car and tray, by means of a movable portion of the track or way, as set forth.

1,714.—T. M. Richardson, of Searsport, Maine, for a Baggage Director:

I claim the baggage director, substantially as described, and for the purposes specified.

1,715.—G. W. Robinson, of Somerville, Mass., for an Improved Steering Apparatus:

I claim the combination of the screen shaft, E, nut, L, connecting rod, K, arm, H, and pivot box, F, on the rudder head, the whole arranged to operate substantially as described, for the purpose set forth.

1,716.—Caleb Russell, of Pittsburgh, Pa., for an Apparatus for Destroying Insects, Reptiles, &c.:

I claim the adjustable valve, H, to cut off or graduate the supply of offensive material, in combination with the vessel, J, and bellows, A, the whole being constructed and arranged to operate substantially as described, for the purposes set forth.

1,717.—John Russell, of Troy, N. Y., for an Improvement in Lamps:

I claim, in combination with the wick tubes and wick of lamps, the water reservoir, B, tube and wick, b, or its equivalent device, for producing and introducing the vapor of water, or of any similar fluid, in or in contact with the lamp flame, substantially in the manner and for the purposes as described and shown.

1,718.—Wm. G. Schmidlin and J. W. Driscoll, New York City, for an Improvement in Reflectors for Lamps:

I claim the curved sections of glass applied within the curved metallic reflector in the manner and for the purposes specified.

1,719.—H. H. Seeley and P. Griswold, of Hudson, Mich., for an Improvement in Grain Separators:

We claim, first, The oscillating trough, d, the spring, c, and the screen, e, arranged and operating in the manner and for the purpose set forth.

Second, The arrangement of the shaker, a, springs, b b, adjustable bottom, f, hinged bottom, g, and spring, h, in the manner and for the purpose specified.

Third, The arrangement of the screen, i, the rod, j, the shoe, H, and the rocker, k, the same being connected and operating as and for the purpose set forth.

1,720.—T. J. Southard, of Richmond, Maine, for an Improvement in Pumps:

I claim the combination of the weighted fly wheel, the slotted pendulum, crank pin, M, and lever, H, operating two or more pumps, when arranged substantially as set forth.

1,721.—S. Z. Shores, of Towanda, Pa., for an Improvement in Hand Corn Planters:

I claim the combination of vibrating tongue, C, as described, with the rocking seed-dropping portion, G, arm, h, rod, i, arranged in the relation to swell, g, of side, B, and operating in harmony with the tongue, C, as described and shown.

[The nature of this invention consists in constructing the seed case with three sides, movable and with a vibrating opener at the bottom of the stationary side of the case, which is operated by depressing the movable portion of the case, and in combining with that portion of the seed case which is movable a seed-dropping device, which is connected with the stationary portion of the seed case by means of jointed arms, the whole being so arranged that the desired number of grains of corn will be planted each time the lower end of the machine is pressed into the earth.]

1,722.—T. F. Strong, of Fond du Lac, Wis., for an Improved Apparatus for Heating and Ventilating Railroad Cars:

I claim the combination of the hood with its inclined surface, and automatic valve, with the inlet pipe, hot-air chamber, distributing pipe and registers, when the several parts are constructed and arranged to operate in the manner and for the purpose set forth.

1,723.—C. W. Strout, of Calais, Maine, for an Improved Machine for Mortising Blind Slats:

I claim, first, The arrangement of the bar, O, slotted plates, P P, bar, Q, and adjustable stop, h, with the eccentric, i, or its equivalent, for the purpose specified.

Second, The bar, R, with rack bar, U, attached and fitted on bar, O, in connection with the spring catch, V, in bar, O, when the bar, R, and rack bar, U, are used in connection with the bar, O, and arranged to operate conjointly therewith, for the purpose specified.

Third, The combination of the treadle, H, straps, W W, bar, G, lever, F, and strap, f, substantially as shown, for the purpose of operating simultaneously the bar, O, and mandrel, C, as described.

[This invention relates to a machine for cutting oblique mortises in the stiles of window blinds, for the purpose of receiving the slats. The object of the invention is to obtain a machine which will perform the desired work very expeditiously and perfectly, and by an extremely simple manipulation of parts—the mortises being spaced at proper and equal distances apart and with a greater or less degree of obliquity as may be required.]

1,724.—E. A. Tuttle, of Brooklyn, N. Y., for an Improved Fire Place Register:

I claim, as a new article of manufacture, the summer piece made ready for use by the arrangement and combination of the reserve pieces, b b, with the ornamental border, A, adjustable at points beyond the register opening, all substantially in the manner set forth.

1,725.—A. J. Vantuyl, of Hector, N. Y., for an Improvement in Grain Separators.

I claim an improved separator, for thrashing machines, consisting of the adjustable cylindrical rotating screen, G, combined and arranged with the fan, H, and carriers, D and E, substantially in the manner and for the purpose shown and described.

1,726.—W. L. Washburn, of Springfield, Mass., for an Improved Ventilator:

I claim the combination of the flanged shelf, C D, and hinged valve, F, with the window, A B, the whole being constructed and arranged in the manner and for the purpose shown and explained.

1,727.—S. A. Willett, of Philadelphia, Pa., for an Improved Heater and Boiler:

I claim the hollow fire pot, C, when combined with the inner casing, B, and outer casing, A, and with the boiler, H, and its inlet and outlet pipes, by means of the pipes, L and M, as and for the purpose set forth.

1,728.—Wm. Youdan and D. Thomas, of West Elizabeth, Pa., for an Improvement in Coal Railroads:

We claim so constructing the inclined plane of coal railroads as that the grade at one end, near the coal pits, shall be very steep, while the grade of the remaining portion of the road is but slightly inclined, and continuing the rope to which the cars are attached over both the steep and the more level portions of the road, for the purpose of gaining power, by the descent of loaded cars on the steep grade, to carry forward other loaded cars down that portion of the road which is not sufficiently inclined to cause them to descend by their own unaided gravity, as well as to draw up the empty cars on the other track, substantially as described.

Also, the use of a clasp constructed as described, of the hinged strips, t t, and slide, v, for the purpose of attaching the cars to the endless rope.

1,729.—McClintock Young, Jr., of Frederick, Md., for an Improved Gearing for Driving Machinery:

I claim a bevel pinion constructed of tapering wires set in suitable heads, to form the teeth or cogs, substantially as and for the purpose set forth.

1,730.—Edward Behr (assignor to himself and H. C. Mangels), of Brooklyn, N. Y, for an Improved Skate:

I claim the employment of the detachable slotted screw studs when made and applied as set forth and for the purpose specified.

[This invention relates to a novel means for securing the skate iron to the wooden stock of the skate, and at the same time giving a firm lateral bearing for the stock, so that it will not be liable to split longitudinally in consequence of the straining and concussions incident to the use of skates.

1,731.—L. J. Johnson (assignor to himself and James E. Owens), of Philadelphia, Pa., for an Improvement in Match Holders:

I claim the match holder, B, with elliptic sheet spring clamps, c c, for retaining the matches in place, and compelling them to "rub" against a center plate, d, with emery or sand-paper, or their equivalents attached thereon, for the purpose of causing ignition to the match when withdrawn from the same, the whole being arranged within and connected to the box or case, A, in a manner substantially as and for the purposes specified.

1,732.—Wm. A. Kirby, of Buffalo, N. Y., assignor to himself and D. M. Osborne, of Auburn, N. Y., for an Improvement in Harvesting Machines:

I claim, first, in combination with an automatic rake in a reaping machine a hinged reaching post and two connecting rods, operated from one and the same crank, for the purpose of giving said rake its motions, substantially as described.

I also claim hinging and supporting the rake post on the main frame, and inclining it backward, so that the rake will be out of the way of the falling grain when at rest, and be raised high enough as it moves towards the outside divider, to avoid the falling grain, and drop beyond the stalks on the platform preparatory to sweeping them off, substantially as described.

I also claim, in combination with a rake post on the main frame and the rake driving shaft supported at one end on a supplemental frame, the two frames having motions independent of each other, the universal joint, k, in the rake shaft, for the purpose of preventing cramping in the gearing, substantially as described.

I also claim, in combination with an automatic rake, the lever, trigger, and clutch arm, substantially as described, so that the driver at his seat may stop or set the rake in motion at his will, or set the trigger so that it will stop it after making one revolution or operation, as described.

I also claim placing or making a guard or shield rigid upon a supplemental frame or plate to which the driving wheel is attached, and passing it under and partially around the gearing attached to said wheel, to protect it from injury or from being clogged, substantially as described.

1,733.—T. J. Mayall, of Roxbury, Mass., assignor to Cyrus Wakefield, of South Reading, Mass., for an Improvement in the Mode of Cutting Ratan into Strands:

I claim the method described of first dividing the surface of ratan into longitudinal sections by cutting the stick or cane to a requisite depth and then separating said sections from the core, to form strands for caning chairs and other purposes.

1,734.—James Poole (assignor to himself and Jas. Ingram), of New York City, for an Improvement in Gas Burners:

I claim the deflecting button, b, wire gauze, c e, and disk, d, applied in the gas burner in the manner and for the purposes specified.

1,735.—Jacob Reighard, of Birmingham, Pa., assignor to Hale, Atterbury & Co., of Pittsburgh, Pa., for an Improvement in Glass Lamps:

I claim a new article of manufacture produced in the manner described, to wit, a glass lamp which has two distinct openings, a b, in its top, one in the center for the introduction of the wick into the lamp, and the other at one side of the center, for filling in the oil or other burning fluid, substantially as and for the purposes set forth.

RE-ISSUES.

99.—Nath. Cope and Wm. Hodgson, of Cincinnati, Ohio, for an Improvement in Butterfly Valves. Patented May 10, 1859:

We claim making the opening or openings controlled by the governor, valves of steam engines of gradually increasing capacity from the closed to the open position, when the valve and case are constructed and arranged to operate substantially in the manner herein specified.

Second, Controlling the excess of motion imparted to the governor valves by means of the adjustment represented and described.

100.—Jeremiah Stever, of Bristol, Conn., for an Improvement in Machines for Burnishing Metals. Patented May 1, 1855:

I claim the combination of these three things, viz., a tool proper for burnishing metals and caused to traverse mechanically, a rest or support for the article to be burnished, and a contrivance for holding the tool and article to be burnished, in working contact by a yielding or spring pressure, the combination being substantially such as specified.

101.—James S. Upton, of Battle Creek, Mich., for an Improvement in Horse Power. Patented Feb. 5, 1861:

I claim, first, The employment of the center pinion, G, when provided with a flanched collar, c, which fits into a corresponding opening in the bevel wheel, I, by means of which a firm and at the same time an easily separated connection is formed between the wheels, as set forth.

Second, The combinatton of the pinion, G, with the wheels, I and L, and shaft, J, also the combination of shaft, J, with wheels, D and K, so that I may use more power and less speed, or the converse, substantially as specified.

Third, The arrangement of the shoe, e, the levers, M and N, and the connecting bar, o, when the same are constructed and used in the manner and for the purpose set forth.

102.—A. A. Hotchkiss, administrator of the estate of A. Hotchkiss, deceased, late of Sharon, Conn., for an Improved Projectile for Rifled Ordnance. Patented October 16, 1855:

I claim, first, Constructing a projectile in three parts, one of them of flexible or plastic material, in the form of a ring, interposed between the other two parts formed of a harder material, and so arranged that in the act of loading or of firing or of both, the resistance or the explosive effect of the powder acting on a larger sectional area of the part, E, than the section of the ring, C, shall cause the latter to be so expanded or distended that it shall take the impression of the grooves and be made to fit the bore of the gun, as described.

Second, The tail piece for securing the cap to the body of the shot and as a guide to the cap in its forward motion, in the manner described.

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Notes and Queries

W. S., of Ohio.—The bore of Whitworth's gun is made six-sided, as you supposed, and with a twist. His English patent covers all polygonal forms.

G. T., of Mass.—We think that water cement and gravel makes the best pipe for conducting water. It will be necessary to get some one who understands the art to lay it for you, or to show you how.

E. H. P., of Ill.—We do not think your diagram of the comet's positions of sufficient interest to pay for engraving.

W. R. T., of N. Y.—There is difference of opinion about the propriety of placing iron shields for ships upon elastic surfaces; some high authorities claiming that the more solid the backing, the better. It is entirely settled, however, that plates welded together in one solid mass offer far greater resistance than if merely riveted or bolted together.

W. E. S., of Conn.—Sharp's percussion pellets were patented in 1853. He also has a patent for throwing a percussion pellet between the hammer and nipple while the hammer is falling.

W. H., of N. Y.—By boiling cocoanut oil with a small quantity of carbonate of soda, an ounce to the gallon, for half an hour, then allowing it to settle, it will be deprived of its fœtid smell in a great measure, but not perfectly.

G. G., of Ohio.—You can obtain Holzapfel's "Mechanical Manipulations" from Balliere Brothers, No. 440 Broadway, or John Wiley, No. 56 Walker-street, this city.

G. S., of Mo.—When A, who is patentee, sells a machine to B, the latter can lend it to whom he pleases, unless there is some specific clause in the bill of sale prohibiting him to do so.

T. S. H., of Ill.—Various specifics have been recommended for preventing scale in steam boilers. The use of some slippery elm bark fed into the boiler weekly, and blowing off with the surface cock frequently, will keep a boiler clean for a long time when using hard water.

W. F. M., of Pa.—Bourne's "Catechism of the Steam Engine," and Bourne's "Treatise on the Steam Engine," would afford you all the information desired. They are published in London.

T. G., of Md.—When or by whom guns were invented is uncertain. The origin both of guns and gunpowder is involved in obscurity. It is recorded that Mahomet II. battered the walls of Constantinople with cannon in the year 1453, some of them being of the caliber of 1,200 lbs., throwing enormous stones at the rate of three or four per day. During the interval of firing, all damage done to the assaulted fortification could generally be repaired. At an earlier period than this, the French procured cannon for the invasion of Italy, which cannon were mounted on carriages and drawn by horses.

D. C., of Canada.—We cannot encourage you to apply for a patent on your paddle wheel. The same thing was patented some years ago by Abner Chapman, and we find it also illustrated in the volume of Canadian patents just issued, page 546.

J. R. F., of N. Y.—You do not state clearly when the infringement commenced, nor whether they infringed both the original claim and the reissued claim, or only the latter. If there was an infringement of the original claim, then the infringer is liable for damages upon the original patent up to the date of the reissue. Liability as to the reissued patent would commence with the date of the reissue.

D. McJ., of C. W.—The substance that you send us is mica, one of the three stones that form granite. The other two are quartz and feldspar. In regard to your subscription, our books show that your term expired with No. 22, Vol. IV. We presume you were credited with the amount you specify.

O. P. C., of Maine.—We do not know anything about the merits of McCormick's extension cases, and have seen none of the testimony. What we hope ever to contend for, in all such cases, is a fair, impartial hearing, and a decision based upon the facts as sustained by the evidence. If mere prejudice and interest are allowed to bear rule against an applicant, then the intention and spirit of our patent law is nullified. If a man is arrested for crime, he is supposed to be innocent until found guilty by evidence submitted according to law.

B. M., of N. Y.—Wells' "Philosophy," published by Gould & Lincoln, Boston, will give you the latest facts in electricity. The following are reliable works on photography :— Hardwick's "Photographic Chemistry," $2.25; Waldack's "Photography," $1; "The Ambrotype," 25 cents. You can get these of Chas. A. Seely, editor of the *Photographic Journal*, No. 244 Canal-street, New York. There is no gain of power by the lever. What is gained in power is lost in time.

A. J. B., of C. T.—Iron pyrites may be rendered soluble in water by roasting slowly first in the open hearth, or roasting in any furnace where a full supply of air is admitted.

E. H. F., of Mass.—In order to become a first-rate engineer, you must go into an establishment where engines are built, and become a practical engineer. King's work on steam propellers is published by D. Van Nostrand, No. 192 Broadway, this city.

Byron Kilbourn, Milwaukie, Wis., wishes to correspond with the best manufacturer of steel in the United States.

J. G. W., of N. Y.—You can procure a good steam heating apparatus of Messrs. Leeds & Vaux, No. 110 Broadway, this city.

C. C., of Pa.—Send us on your model and first installment of patent fee without delay, and we will prepare your case at once. The business of the Patent Office goes on with great regularity.

J. B. S., of Pa.—We do not know any maker of pumps who will erect them and insure their drawing water through 150 yards of suction pipe, and force it 60 feet high. That pumps can be made to draw water that distance, we have no doubt; but the difficulty in making them operate satisfactorily will be in securing perfectly air tight suction pipes.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, July 17, 1861:—

J. K. G., of N. Y., $15; B. & T., of N. Y., $43; E. T. de V., of N. Y., $15; W. H. S., of Conn., $15; R. P., of N. Y., $15; J. A. & A. S. H., of Ill., $25; N. H. B., of Mass., $15; F. J. B., of Wis., $10: H. H., of Ill., $12; G. & B., of N. Y., $15; J. M., of Ohio, 15; L. K., of N. Y., $15; J. W. C., of N. Y., $20; C. F. B., of R. I., $20; A. H. H., of Mass., $25; T. E. R., of Mass., $25; S. L. M., of Conn., $15; J. C., of Ohio, $25; J. M., of Iowa, $15; D. P. M., of Ill., $15; A. F. W., of Pa., $20; O. W. K., of Wis., $15; M. M., of Mass., $15; C. C. P. W., of Mass., $30; K. & B., of Cal., $5; P. H. S., of Cal., $5; G. W. M., of Ohio, $15; J. J., of N. Y., $15; J. B. V. D., of N. Y., $15; T. G. B., of Mass., $15; M. C. W., of Ill., $12; L. H. O, of N. Y., $15; J. L., of Mich., $25; W. H. B., of Mass., $30; J. A., of Maine, $25; W. J. S., of N. Y., $25; A. L. W., of Mass., $20; S. C., of N. Y., $20; W. D., of Mo., $20; A. B., of C. W., $20; T. D., of Iowa, $20; C. K., of Vt., $20; W. D. B., of Mass., $20.

Specifications and drawings and models belonging to parties with the following initials have been orwarded to the Patent Office from July 10 to Wednesday, July 17, 1861:—

M. C. W., of Ill.; B. A. M., of Ct.; J. N. D., of Iowa; P. H. S., of Cal.; W. R., of N. Y.; J. M. B., of N. Y.; J. K. G., Jr., of N. Y.; C. C. P. W., of Mass.; J. C., of Ohio; J. L., of Mich.; J. J. S., of N. Y.; L. C., of N. Y.; D. S., of N. Y.; W. H. B., of Mass.; T. C. R., of Mass.; A. H. H., of Mass.; B. and C., of N. Y.; J. A. and A. S. H., of Ill.; J. M., of Ohio; H. H., of Ill.; G. J., of N. Y.; G. D. H., of Ill.; C. A., of Ill.; L. and W., of N. Y.; C. A., of Paris.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

NVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

BINDING.—We are prepared to bind volumes, in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express or delivered at the office, 40 cents.

BACK NUMBERS AND VOLUMES OF THE SCIENTIFIC AMERICAN.—Volumes I., II. and III. (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1.50 per volume. by mail, $2—which includes postage. Price in sheets, $1. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application to this office. Address MUNN & CO., No. 37 Park-row, New York.

INSTRUCTIONS ABOUT EUROPEAN PATENTS, With a Synopsis of the Patent Laws of the Various Countries.

AMERICAN INVENTORS SHOULD BEAR IN MIND that, as a general rule, any invention which is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Four patents—American, English, French and Belgian—will secure an inventor exclusive monopoly to his discovery among 100,000,000 of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the Scientific American Patent Agency. We have established agencies at all the principal European seats of government, and obtain patents in Great Britain, France, Belgium, Prussia, Austria, Spain, &c., with promptness and dispatch.

It is generally much better to apply for foreign patents simultaneously with the application here; or, if this cannot be conveniently done, as little time as possible should be lost after the patent is issued, as the laws in some foreign countries allow patents to any one who first makes the application, and in this way many inventors are deprived of valid patents for their own inventions.

Many valuable inventions are yearly introduced into Europe from the United State, by parties ever on the alert to pick up whatever they can lay their hands upon which may seem useful.

Models are not required in any European country, but the utmost care and experience is necessary in the preparation of each case.

GREAT BRITAIN.

Patents for inventions under the new law, as amended by the act of Oct. 1, 1852, and now in operation, include the United Kingdom of Great Britain and Ireland in one grant, which confers the exclusive right to make, use, exercise or vend. This is conceded to the inventor, or the introducer, for a period of fourteen years, subject, after the patent is granted, and the first expenses paid, to a government tax twice during its existence—once within three years, and once again within seven. The purchaser of a patent would assume the payment of these taxes.

There is no provision in the English law requiring that a patented invention shall be introduced into public use within any specified limit. Under the Patent Act of October, 1852, the British government relinquished its right to grant patents for any of its colonies, each colony being permitted to regulate its own patent system. If a patent has been previously taken out in a foreign country, the British patent will expire with it.

FRANCE.

Patents in France are granted for a term of fifteen years, unless the invention has been previously secured by patent in some other country; in such case, it must take date with and expire with the previous patent. After the patent is issued, the French government requires the payment of a small tax each year so long as the patent is kept alive, and two years' time is given to put the invention patented into practice.

It should be borne in mind that, although the French law does not require that the applicant should make oath to his papers, yet if a patent should be obtained by any other person than the inventor, upon proof being adduced to this effect before the proper tribunal, the patent would be declared illegal.

BELGIUM.

Patents in Belgium are granted for twenty years, or if previously patented in another country, they expire with the date thereof. The working of the invention must take place within one year from date of patent; but an extension for an additional year may be obtained on application to the proper authorities. Inventors are only legally entitled to take out patents.

THE NETHERLANDS.

Patents are granted by the Royal Institute of the Netherlands to natives or foreigners represented by a resident subject, which extend to a period of about two years, within which time the invention must be brought into use, and upon payment of an additional tax, a patent will be granted to complete its whole term of fifteen years. Unless these conditions are complied with, the patent ceases.

PRUSSIA.

Applications for patents in Prussia are examined by the Royal Polytechnic Commission, and unless there is novelty in the invention, the applicant's petition will be denied; and if it is granted, the invention must be worked within six months afterward. A respite, however, of six additional months may be obtained, if good and sufficient reasons for it can be shown.

AUSTRIA.

Austrian patents are granted for a term of fifteen years, upon the payment of 1,000 florins, or about $500 in American currency. This sum, however, is not all required to be paid in advance. It is usual to pay the tax for the first five years upon the deposit of the papers, and the patent must be worked within its first year. The Emperor can extend the patent and privilege of working by special grant. In order to obtain a patent in Austria, an authenticated copy of the original Letters Patent must be produced.

SPAIN.

The duration of a Spanish patent of importation is five years, and can be prolonged to ten years; and the invention is to be worked within one year and one day.

To obtain a Cuban patent requires a special application and an extra charge.

RUSSIA.

Since the close of the Crimean war, considerable attention has been given to Russian patents by Americans. Russia is a country rich in mineral and agricultural products, and there seems to be a field open for certain kinds of improvements. The present Emperor is very liberally disposed toward inventors, and as an evidence of the interest which he takes in the progress of mechanic arts, we may state that we have had visits from two distinguished Russian *savans*, specially sent out by the Emperor to examine Amdrican inventions. As Russian patents are expensive, and somewhat difficult to obtain, we do not take it upon ourselves to advise applications; inventors must judge for themselves; and this remark applies not only to Russia, but also to all other foreign countries.

CANADA.

Patents of invention are granted only to actual residents of Canada and British subjects. Under the general Patent Law of Canada, an American cannot procure a patent for his invention there. The only way in which he can do so is by virtue of a special act of Parliament, which is very difficult, uncertain, and expensive to obtain. Several zealous friends of reform in Canada are working earnestly to bring about a reciprocal law, but their efforts have thus far proved fruitless.

BRITISH INDIA.

The date of the law, Feb. 28, 1856; duration of a patent, fourteen years. Invention must be worked within two years from date of petition. Privilege granted only to the original inventor or his authorized agent in India.

SAXONY.

Duration of patent, from five to ten years. Invention must be worked within one year from date of grant. Careful examination made before granting a patent.

HANOVER.

Duration of patent, ten years; and in case of foreign patent having been previously obtained, an authenticated copy of said patent must be produced. Invention must be worked within six months from date of grant.

SARDINIA.

Duration of patent, from one to fifteen years. Patents for five years or less must be worked within one year, and all others within two years.

NORWAY AND SWEDEN.

Duration of patent, three years, at least; fifteen at most, according to the nature and importance of the invention. Patents for foreign inventions not to exceed the term granted abroad, and to be worked within one, two or four years.

AUSTRALIA.

Date of law, March 31, 1854. Careful examination made by competent persons previous to issue of patent, which, when granted, extends to fourteen years. Imported inventions are valid according to duration of foreign patent. It would require from twelve to eighteen months to procure a patent from the Australian government.

Parties holding foreign patents secured through our agency will be notified from time to time of the condition of their cases.

GENERAL REMARKS.

While it is true of most of the European countries herein specified, that the system of examination is not so rigid as that practised in this country, yet it is vastly important that inventors should have their papers prepared only by the most competent solicitors, in order that they may stand the test of a searching legal examination; as it is a common practice when a patentee finds a purchaser for his invention for the latter to cause such examination to be made before he will accept the title.

It is also very unsafe to entrust a useful invention to any other than a solicitor of known integrity and ability. Inventors should beware of speculators, whether in the guise of patent agents or patent brokers, as they cannot ordinarily be trusted with valuable inventions.

Messrs. MUNN & CO. have been established *fifteen years* as American and Foreign Patent Attorneys and publishers of the SCIENTIFIC AMERICAN, and during this time they have been entrusted with some of the most important inventions of the age; and it is a matter of pardonable pride in them to state that not a single case can be adduced in which they have ever betrayed the important trust committed to their care. Their agents in London, Paris, and other Continental cities, are among the oldest and most reliable Patent Solicitors in Europe, and they will have no connection with any other.

CAUTION.—It has become a somewhat common practice for agents located in England to send out circulars soliciting the patronage of American inventors. We caution the latter against heeding such applications, or they may otherwise fall into the hands of irresponsible parties, and thus be defrauded of their rights. It is much safer for inventors to entrust their cases to the care of a competent, reliable agent at home.

FEES.—The fees required by us for the preparation of foreign applications are not the same in every case; as, in some instances, when the inventions are of a complicated character, we are obliged to charge a higher fee. Applicants can always depend, however, upon our best terms, and can learn all particulars upon application, either in person or by letter.

Parties desiring to procure patents in Europe can correspond with the undersigned, and obtain all the necessary advice and information respecting the expenses of obtaining foreign patents.

All letters should be addressed o Messrs. MUNN & CO., No. 37 Park-row, New York.

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CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS---PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, are now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees, at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering estimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

Testimonials.

The annexed letters, from the last three Commissioner of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent, &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the government fee, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO No 37 Park-row New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, o prepare arguments, and appear before the Commissioner of Patents or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors.*" Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited For rther particulars, address MUNN & CO., No. 37 Park-row, New York .

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

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Thirty Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

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Being about to retire from business, I have sold my stock of Swiss Mathematical Instruments to Messrs. MCALLISTER & BROTHER, of No. 728 Chestnut street, Philadelphia, who will continue to keep such for sale, and to whom I refer my former friends and customers.

C. T. AMSLER.

Philadelphia, Pa., June 12, 1861. 1 tf

A MESSIEURS LES INVENTEURS—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,

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The Rhode Island Society for the Encouragement of Domestic Industry offer the following:

A premium of thirty dollars for a bale of not less than fifty pounds of the best prepared Flax Cotton, fit for use on cotton machinery, accompanied with a statement of its culture, production and preparation, including cost of the various processes.

A premium of twenty dollars for the second best bale of the same, on the same conditions.

The bales to be delivered at the rooms of the Society on or before Sept. 11, 1861. The premiums will be awarded by the Standing Committee at their meeting to be held on the third Wednesday in September, and paid as soon as awarded.

The Society will defray all the necessary expenses of transportation on the bales of proper size offered for premiums, and will claim the right to retain the same at their pleasure, on payment of a fair price.

The flax cotton will be open for public examination at the Exhibition of Vegetables, Fruits and Flowers, to be held by the Society at Railroad Hall, September 11, 1861. W. R. STAPLES, Sec'y.

Communications upon this subject may be addressed to the Secretary of the Society, or to either of the following persons as the Special Committee of the Society upon Flax Culture, &c.

James Y. Smith, Providence.
William Viall, "
His Excellency, William Sprague, Providence.
Bailey W. Evans, "
Robert S. Burrough, "
Edward Harris, Woonsocket, "
Elisha Dyer, Providence, Chairman.
Lyman B. Frieze, " Secretary. 4ft

TO MILLERS.—THE UNDERSIGNED OFFER AT A bargain the Valley Flouring Mill, located at Little Falls, Herkimer county, N. Y. It contains three runs of Stones, with water-power for five more, and is situated in the heart of the great dairying district, thus making a home trade for all the flour and feed the mill can grind; capacity, 100 barrels per day. It is within 200 feet of either railroad or canal, and is without doubt the finest location in the State for a safe milling business. A portion of the purchase can remain on bond and mortgage. A. RATHBUN & CO.,
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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

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nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. St. sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche, welche patentiren wollen.

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BLASTING BY ELECTRICITY.

The following illustrated description for conducting blasting operations by electricity is, in substance, taken from the Calcutta *Engineer's Journal*, and will be found very useful and interesting to many of our readers. It is best adapted for large blasts, as it would be rather expensive in comparison with the fuse, for common operations, such as blasting small rocks :—

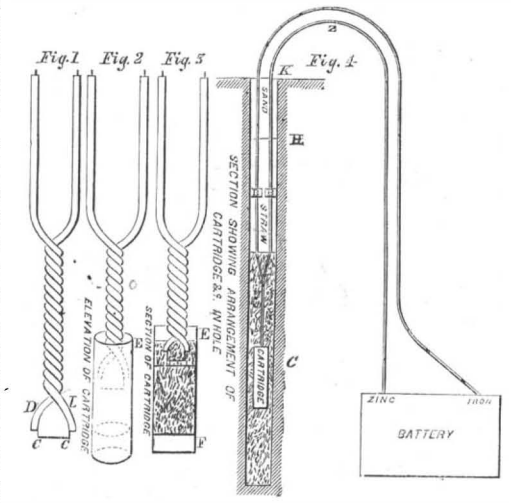
PREPARATION OF CARTRIDGES.

Take two copper wires covered with gutta-percha of the ordinary size employed to make the connections of telegraph instruments commonly called No. 0 gutta-percha wire. They may be of any length most convenient from 6 inches upwards. In the annexed drawing, Fig. 1, they are shown for convenience sake to be only about 6 inches in length, but it would be preferable to have them sufficiently long to project out of the hole a few inches above the surface of the ground, because then no fears need be entertained of any derangement to the connections made with the two battery wires to the two ends, A A, Fig. 1, during the process of filling in the hole, which derangement would injure the insulation and nullify the action of the battery. It should be observed here, that in cases where the shorter wires are used, it will be necessary, after making the connections with the battery wires, to cover the connections over with thin sheet gutta-percha (or paper would do, if the hole is perfectly dry) so as to insulate them perfectly from each other and from the earth. B B, Fig. 4, will illustrate the manner in which this is done.

Let the two wires first mentioned be twisted together for a length of about 3 inches, as shown in Fig. 1, care being taken to leave their lower extremities, C C, free for about an inch, separating them about half an inch from each other. Remove the gutta-percha covering for a length of about a quarter of an inch, as shown at, C C, Fig. 1, and brighten up the ends with sand paper, and then stretch across them a very fine iron, or better, platinum wire (also previously brightened up with sand paper), twisting it round the copper wires, and fixing it in the manner shown in the figure. The upper extremities of the two wires, A A, are also separated, and the gutta-percha stripped off for about an inch, for the purpose of connecting them to the two wires which are to proceed to the poles of the battery. If these connections, owing to the shortness of the wires, are to come within the hole, great care must be taken to insulate them from each other and from the earth in the manner already explained and shown at B B, Fig. 4. Fig. 2 shows the body of the cartridge, which consists of a tin tube 3 inches in length and three quarters of an inch in diameter, the joint being well soldered in order that it may be impermeable to water. On introducing the wires into the tube they should be placed in the center, as shown in Fig. 2, and great care should be taken to prevent the two wires from touching the outside of the tube anywhere. To guard against this most effectually, the two ends should be opened out and then turned inward again, as at D D, Fig. 1, so that the gutta-percha shall press well against the sides of the tube; thus removing all possibility of the exposed ends of the wire coming into contact with it. The two wires are passed through a cork, and fitted firmly to the upper end of the tin tube, as shown at E E, Figs. 2 and 3, and made perfectly water tight by being covered over with a cement composed of two parts beeswax and one part resin. The tube is then filled with powder at its other extremity F, which is likewise stopped with a cork and cemented in the same manner. Fig. 2 shows the manner in which the cartridge is placed in the hole, after having carefully expelled all dust and moisture, great care being taken that the cartridge is situated in about the center of the charge of powder introduced into the hole, as shown at G, Fig. 4. Above the powder is placed a plug of straw, dry grass, or tow, shown at H, to allow, between the powder and the filling in, a small space filled with air, and above the plug dry sand is poured in until the hole is filled up to the surface, as shown at K. The two ends of the wire then, z I, which projects above the surface of the ground, are connected with the two poles of the battery by means of insulated conductors of sufficient length to allow of perfect protection from any dangers arising from the explosion. The greatest caution should be observed in not connecting the two wires with the battery until the moment the explosion is required to be made, as the effects are instantaneous. If necessary, a number of shots can be fired together, either simultaneously or in such rapid succession as to be all but simultaneous.

BATTERIES.

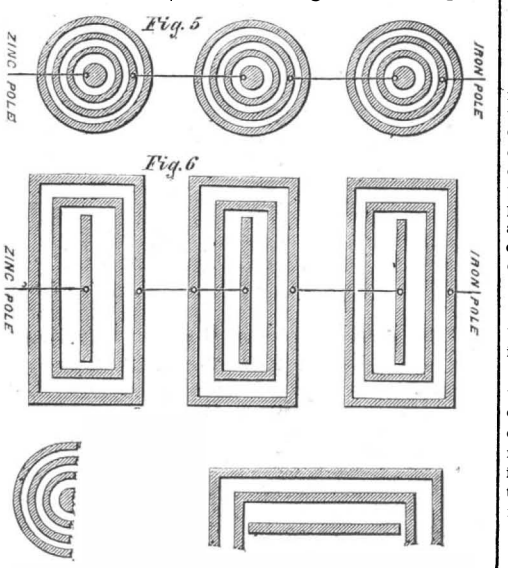
The battery best adpted for igniting the cartridges is Callan's battery, commonly called the "Maynooth Battery." This is the simplest and cheapest form of battery, and can be most readily made up in India. It is very powerful, fifteen cells being sufficient for all purposes of ignition, or for conducting electrical experiments in general. Two forms of this battery are shown in Figs. 5 and 6, the one being circular and the other square. Three cells of each kind are only shown, as they are quite sufficient for illustration.



The number of cells required to make up a battery sufficiently powerful for firing a shot will be from fifteen to fifty, according to circumstances.

CIRCULAR CELL BATTERY.

The battery consists of, first, a circular earthenware cell; secondly, a circular iron plate; thirdly, a porous cell; and, fourthly, an amalgamated zinc ingot. These three last named are placed within the earthenware cell in the order above enumerated, and which will be seen more clearly by referring to cell M, Eig. 5. After placing them together, the space between the porous cell and the earthenware cell is filled up to within half an inch of the top with pure nitric acid, while the porous cell is filled up to within half an inch of the top with sulphuric acid diluted with water in the proportion of 1 of acid to 10 of water. The cells are connected together with a piece



of copper wire, care being taken to connect the iron of one cell to the zinc of the next cell, and so on, connecting the iron and zinc alternately throughout, as shown in Fig. 5.

SQUARE CELL BATTERY.

This battery is simpler in arrangement than the previous one, and can be made up more easily and rapidly in this country. The outer cell is of iron, within which is placed the porous cell, and within the porous cell is placed the amalgamated zinc plate. The arrangement is clearly shown in cell O, Fig. 6. The pure nitric acid is poured within the space between the porous cell and iron cell to within half an inch of the top, and the sulphuric acid, diluted with water, as before, in the proportion of 1 of acid to 10 of water, is poured into the porous cell, filling it up to within half an inch of the top of the cell. The connections are made as before, the iron cell being connected with the zinc plate in the adjoining cell, and so on alternately throughout; great care should be taken to prevent the iron cells from touching each other, and it is necessary in arranging them to put a piece of brown pasteboard or wood between each. Ten of these cells are sufficient to ignite the cartridge, but the actual number to be used depends upon the circumstances and nature of the operations. Twenty cells of this battery have been found sufficient for producing the electrical light.

Mines may be sprung at a considerable distance away by the electric battery, as thus described. The Russians had the Malakoff and the Redan Towers all mined underneath, and filled with powder, in order to blow them up if the allies should storm them. They had wires connected with an electric battery at some distance off, but the Malakoff was saved from being blown up when the French entered, for a cannon ball had cut the electric cord, and the mine was thus rendered harmless. Part of the Redan was blown up, but no person was injured, as the English soldiers had been withdrawn almost as soon as they entered, as it was rightly suspected the fort had been mined.

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To the Inventor!

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